
State of California
The Resources Agency
Department of Water Resources

**SP-T2 PROJECT EFFECTS ON
SPECIAL STATUS PLANT SPECIES
DRAFT FINAL REPORT**

**Oroville Facilities Relicensing
FERC Project No. 2100**



MARCH 2004

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REPORT SUMMARY

Numerous special status plant species have potential to occur in the project vicinity. These include species classified as threatened, endangered, or rare under the State or Federal Endangered Species acts ("listed" species), U.S. Forest Service (USFS) sensitive species, U.S. Bureau of Land Management (BLM) sensitive species, State and Federal Species of Concern, and species identified by the California Native Plant Society (CNPS). Although there were no known occurrences of federal or State listed plant species within the Oroville Facilities project boundary, several occur nearby and suitable habitat exists within the project area. Six species of concern were known to occur within the project boundary prior to this study.

Relatively little was known about the occurrence or distribution of special status plant species within the project vicinity prior to the current study. This study was needed to comply with State and federal regulations. These study results are needed to provide sufficient information for these consultations and CEQA/NEPA documentation. The study will provide information on potential project effects and can be used to identify opportunities for habitat protection and enhancement.

The study area includes the Oroville Facilities Relicensing FERC Project boundary and the lower Feather River floodplain downstream from the Fish Barrier Dam to the Sacramento River. The scope of study for each species focused on areas of suitable habitat within the study area that may be affected by project activities. Habitat for federally or State listed species was completely surveyed.

No State or federally "listed" species were found within the study area during the 2002 and 2003 surveys. Seventy-four special status plant species were originally identified as potentially occurring in the study area. Sixteen of these species plus an additional CNPS List 4 species were found within the project area during the 2002 and 2003 field studies. This includes twelve species listed as species of concern by USFWS, sensitive by the USFS and/or List 1B, 2, or 3 by CNPS. Seven of these species are included on the USFS Sensitive Plants list. Five USFS Special Interest and/or CNPS List 4 species were found within the study area.

Habitat exists for the six federally and/or State listed plant species. Five of these species are associated with vernal pools or ephemeral drainages. Vernal pools and swale complexes are a common part of the valley grassland habitats around the Thermalito Forebay and Afterbay complex. Habitat also exists for Layne's ragwort on serpentine soils along the West Branch and North Fork arms of Lake Oroville and on gabbroic soils along the South Fork arm of Lake Oroville. It was not discovered until after the 2002 and 2003 field seasons that gabbroic soils occur in the Project area. These areas will be surveyed during the spring of 2004.

Potential impacts to special status plant species and their habitats from project related activities may occur from 1) changes in hydrology; 2) facility maintenance or

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development; 3) vegetation and/or wildlife habitat management; 4) noxious weed management; 5) road maintenance and development; and 6) recreational use or development and/or maintenance associated with recreation areas.

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1.0 INTRODUCTION

1.1 BACKGROUND INFORMATION

Existing and future operations of the Oroville Facilities, power generation facilities, recreation facilities, and other activities associated with these facilities may affect special status plant species.

Numerous special status plant species have potential to occur in the project vicinity. These include species classified as threatened, endangered, or rare under the State or Federal Endangered Species acts ("listed" species), U.S. Forest Service (USFS) sensitive species, U.S. Bureau of Land Management (BLM) sensitive species, State and Federal Species of Concern, and species identified by the California Native Plant Society (CNPS). Although there were no known occurrences of federal or State listed endangered, threatened, or rare plant species within the Oroville Facilities project boundary, several occur nearby and suitable habitat exists within the project area. Six species of concern were known to occur within the project boundary.

Public release of specific location information related to special status species can result in increased risk to the species of concern. For this reason, specific location information is treated in a general rather than a specific manner in this report.

1.1.1 Statutory/Regulatory Requirements

The Federal Endangered Species Act (FESA) requires evaluation and consultation to avoid take of listed species or adverse modification of their habitats. The California Endangered Species Act (CESA) also requires assessment of the proposed project's impact on listed species. Both CEQA and NEPA require assessment of a project's impacts on State and federally listed species and their habitats. In addition, CEQA requires an evaluation of species that have not been listed under the FESA or CESA, but meet the definition of threatened and endangered as listed in the CESA. CEQA requires evaluation of project impacts on State and Federal Species of Concern. Both federal land management agencies have an obligation to insure that project operations do not adversely affect sensitive species on federal lands. NEPA procedures and the policies of the BLM and USFS require that information about any sensitive species regardless of status is available to public officials and citizens before decisions are made and before actions are taken.

1.1.2 Study Area

The study area for this investigation includes the Oroville Facilities Relicensing FERC Project boundary and the lower Feather River floodplain downstream from the Fish

Barrier Dam to the Sacramento River. The scope of study for each species focused on areas of suitable habitat within the study area that may be affected by project activities.

The scope of survey for USFS and BLM Sensitive and Special Interest species included federal lands within the study area, adjacent federal lands outside the study area, and State lands within the study area adjacent to federal lands. Areas that are inaccessible due to the steepness of terrain and thickness of vegetation were not surveyed.

1.1.2.1 Environmental Setting

The project study area is located within the Sacramento Valley and Sierra Nevada Foothills subregions of the California Floristic Province (Hickman 1993). Broad vegetation patterns in this area correspond with elevational changes from the valley floor to the upper elevation of the mountain range, ranging from valley grasslands to foothill woodlands (characterized by blue-oak /foothill pine woodlands with varying amounts of chaparral) to mixed conifer forests in the higher elevations. These patterns vary from place to place and are dependent not only on elevation but precipitation, temperature, soils, aspect, slope, and disturbance history (SNEP 1996). This area is characterized by seasons of hot dry summers and moderately cold wet winters. Temperatures range from below zero to above 100°F. Approximately 95% percent of the annual precipitation occurs during the winter months (DWR 2001). Precipitation ranges from less than 33 inches per year at Oroville to 63 inches per year at the upper elevations of the study area.

The primary parent rock types around Lake Oroville are granitic, volcanic, metamorphic, and sedimentary. On the surface, this substrate includes many rock outcrops and some very thin to deep soils. Slopes are extremely variable, ranging from undulating in the lower reaches around the dam to very steep, rugged topography upstream in each of the arms of the lake. The West Branch and Big Bend area of the North Fork arm of the lake are criss-crossed by narrow bands of serpentine within metasedimentary and metavolcanic formations. Both the Middle Fork and the South Fork arms of the lake are underlain by granitic rock. Below Lake Oroville where the toe slope of the foothills meet the Great Valley, the topography flattens dramatically into gently undulating alluvial soils and gravel deposits laid down by the Feather River and older streams. Vernal pools and swale complexes are a common part of the valley grassland habitats in this area. These pools are of the Northern Hardpan type that occurs in areas of hummocky ground on terrace-alluvial derived Redding soils (DFG 1998).

1.1.3 Target Species

Table 1.1.3-1 summarizes the list of special-status plant species that have potential to occur within the study area. This includes seven vascular plant species that are listed under FESA and CESA and an additional 68 species of concern. This list includes 42 vascular plant species on CNPS Lists 1, 2, or 3; 2 bryophytes; 1 lichen; and 23 species

on CNPS List 4. This list was developed based on information compiled from the U.S. Fish and Wildlife Service (USFWS 1999 and 2002); the California Department of Fish and Game's (DFG 2002) Natural Diversity Database records (CNDDDB); the California Native Plant Society's Inventory (CNPS 2001); Plumas National Forest Sensitive and Special Interest Plant list (USFS 2003); DFG's Special Plants List (DFG 2001); and the USFS Pacific Southwest Region Sensitive Plant list (USFS 1998). These species of concern include former USFWS Category 2 candidate species and species of concern to USFS, BLM, and/or CNPS.

Table 1.1.3-1. Special status plant species with potential for occurring within the study area.

Scientific name Common name	Status FWS ¹ /State ² / CNPS ³ /PNF ⁴	Habitat (elevation)	Flowering period
Federal or State listed			
<i>Chamaesyce hooveri</i> Hoover's spurge	FT/--/1B/--	Vernal pools (25-250m)	Jul-Aug
<i>Limnanthes floccosa</i> ssp. <i>californica</i> Butte County meadow foam	FE/SE/1B/--	Valley and foothill grassland (mesic), vernal pools (50-90m)	Mar-May
<i>Orcuttia pilosa</i> Hairy Orcutt grass	FE/SE/1B/--	Vernal pools (55-200m)	May-Sep
<i>Orcuttia tenuis</i> Slender Orcutt grass	FT/SE/1B/--	Vernal pools (35-1760m)	May-Oct
<i>Pseudobahia bahiifolia</i> Hartweg's golden sunburst	FE/SE/1B/--	Cismontane woodland, valley and foothill grassland/ clay (15-150m)	Mar-Apr
<i>Senecio layneae</i> Layne's ragwort	FT/SR/1B/FT	Chaparral, cismontane woodland/ serpentine or gabbroic (200-1000m)	Apr-Jul
<i>Tuctoria greenei</i> Greene's tuctoria	FE/SR/1B/--	Vernal pools (30-1070m)	May-Sep
Species of Concern – CNPS Lists 1, 2, & 3			
<i>Agrostis hendersonii</i> Henderson's bent grass	SC/--/3/--	Valley and foothill grassland (mesic), vernal pools (70-305m)	Apr-May
<i>Allium jepsonii</i> Jepson's onion	SC/--/1B/--	Cismontane woodland, lower montane conifer forest/ serpentine or volcanic (300-1160m)	May-Aug
<i>Astragalus tener</i> var. <i>ferrisiae</i> Ferris's milk-vetch	SC/--/1B/--	Meadows and seeps (vernally mesic), valley and foothill grassland (subalkaline flats) (5-75m)	Apr-May
<i>Atriplex cordulata</i> Heartscale	SC/--/1B/--	Chenopod scrub, meadows and seeps, valley and foothill grassland (sandy)/ saline or alkaline (1-375m)	Apr-Oct
<i>Atriplex depressa</i> Brittlescale	--/--/1B/--	Chenopod scrub, meadows and seeps, valley and foothill grassland, vernal pools/ alkaline, clay (1-320m)	May-Oct
<i>Atriplex minuscula</i> Lesser saltscall	--/--/1B/--	Chenopod scrub, playas, valley and foot- hill grassland/ alkaline, sandy (15-200m)	May-Oct
<i>Atriplex subtilis</i> Subtle orache	--/--/1B/--	Valley and foothill grassland (40-100m)	Aug-Oct
<i>Balsamorhiza macrolepis</i> var. <i>macrolepis</i> Big-scale balsamroot	--/--/1B/SI-1	Chaparral, cismontane woodland, valley and foothill grassland / sometimes serpentine (90-1400m)	Mar-Jun
<i>Calycadenia oppositifolia</i> Butte County calycadenia	--/--/1B/S	Chaparral, cismontane woodland, lower montane conifer forest, meadows and seeps, valley and foothill grassland/ volcanic or serpentine (215-945m)	Apr-Jul
<i>Calystegia atriplicifolia</i> ssp. <i>buttensis</i> Butte County morning glory	SC/--/1B/--S	Lower montane conifer forest (600- 1200m)	May-Jul
<i>Cardamine pachystigma</i> var. <i>dissectifolia</i>	--/--/3/SI-1	Chaparral, lower montane conifer forest/ usually serpentine, rocky (255-2100m)	Feb-May

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Table 1.1.3-1. Special status plant species with potential for occurring within the study area.

Scientific name Common name	Status FWS ¹ /State ² / CNPS ³ /PNF ⁴	Habitat (elevation)	Flowering period
Dissected-leaved toothwort			
<i>Carex vulpinoidea</i> Fox sedge	--/--/2/--	Marshes and swamps (freshwater), riparian woodland (30-1200m)	May-Jun
<i>Castilleja rubicundula</i> ssp. <i>rubicundula</i> Pink creamsacs	--/--/1B/--	Chaparral (openings), cismontane wood- land, meadows and seeps, valley and foothill grassland/ serpentinite (20-900m)	Apr-Jun
<i>Clarkia biloba</i> ssp. <i>brandegeae</i> Brandegee's clarkia	--/--/1B/S	Chaparral, cismontane woodland/ often roadcuts (295-885m)	May-Jul
<i>Clarkia gracilis</i> ssp. <i>albicaulis</i> White-stemmed clarkia	--/--/1B/S	Chaparral, cismontane woodland/ sometimes serpentinite (245-1085m)	May-Jul
<i>Clarkia mildrediae</i> ssp. <i>mildrediae</i> Mildred's clarkia	--/--/1B/SI-1	Cismontane woodland, lower montane conifer forest/ sandy, usually granitic (245-1710m)	May-Aug
<i>Clarkia mosquinii</i> Mosquin's clarkia	SC ⁵ --/1B/S	Cismontane woodland, lower montane conifer forest/ rocky, roadsides (185- 1170m)	May-Jul
<i>Delphinium recurvatum</i> Recurved larkspur	SC/--/1B/--	Chenopod scrub, cismontane woodland, valley and foothill grassland, alkaline (3- 750m)	Mar-May
<i>Downingia pusilla</i> Dwarf downingia	--/--/2/--	Valley and foothill grassland (mesic), vernal pools (1-445m)	Mar-May
<i>Eleocharis quadrangulata</i> Four-angled spikerush	--/--/2/--	Marshes and swamps (freshwater) (30- 500m)	May-Sep
<i>Fritillaria eastwoodiae</i> Butte County Fritillary	SC/--/3/S	Chaparral, cismontane woodland, lower montane conifer forest (openings)/ sometimes serpentinite (50-1500m)	Mar-May
<i>Fritillaria pluriflora</i> Adobe-lily	SC/--/1B/--	Chaparral, cismontane woodland, valley and foothill grassland/ often adobe (60- 705m)	Feb-Apr
<i>Hibiscus lasiocarpus</i> Rose-mallow	--/--/2/--	Marshes and swamps (freshwater) (0- 120m)	Jun-Sep
<i>Juncus leiospermus</i> var. <i>ahartii</i> Ahart's dwarf rush	SC/--/1B/--	Valley and foothill grasslands (mesic) (30-100m)	Mar-May
<i>Juncus leiospermus</i> var. <i>leiospermus</i> Red Bluff dwarf rush	--/--/1B/--	Chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland, vernal pools/ vernal mesic (35-1020m)	Mar-May
<i>Lewisia cantelovii</i> Cantelow's lewisia	--/--/1B/S	Broadleaved upland forest, chaparral, cismontane woodland, lower montane conifer forest/ mesic, granitic, serpentinite seeps (385-1370m)	May-Oct
<i>Lupinus dalesiae</i> Quincy lupine	--/--/1B/S	Chaparral, cismontane woodland, lower/ upper montane conifer forest, openings, often in disturbed areas (855-2500m)	May-Aug
<i>Monardella douglasii</i> ssp. <i>venosa</i> Veiny monardella	SC/--/1B/--	Cismontane woodland, valley and foothill grassland (heavy clay) (60-410m)	May-Jul

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Table 1.1.3-1. Special status plant species with potential for occurring within the study area.

Scientific name Common name	Status FWS ¹ /State ² / CNPS ³ /PNF ⁴	Habitat (elevation)	Flowering period
<i>Myosurus minimus</i> ssp. <i>apus</i> Little mouseltail	SC/--/3/--	Valley and foothill woodland, vernal pools (alkaline) (20-640m)	Mar-Jun
<i>Paronychia ahartii</i> Ahart's paronychia	SC/--/1B/--	Cismontane woodland, valley and foothill grassland, vernal pools (30-510m)	Mar-Jun
<i>Penstemon personatus</i> Closed-throated beardtongue	SC/--/1B/S	Chaparral, lower/upper montane conifer forest, metavolcanic (1065-2120m)	Jun-Sep
<i>Rhynchospora californica</i> California beaked-rush	SC/--/1B/--	Bogs and fens, lower montane conifer forest, meadows and seeps, marshes and swamps (freshwater) (45-1010m)	May-July
<i>Rhynchospora capitellata</i> Brownish beaked-rush	--/--/2/SI-1	Lower/upper montane conifer forest, meadows and seeps, marshes and swamps, mesic (455-2000m)	Jul-Aug
<i>Sagittaria sanfordii</i> Sanford's arrowhead	SC/--/1B/--	Marshes and swamps (assorted shallow freshwater) (0-610m)	May-Oct
<i>Sedum albomarginatum</i> Feather River stonecrop	--/--/1B/S	Chaparral, lower montane conifer forest/serpentinite (260-1785m)	May-Jun
<i>Senecio eurycephalus</i> var. <i>lewisrosei</i> Cut-leaved ragwort	--/--/1B/S	Chaparral, cismontane woodland, lower montane conifer forest/ serpentinite (550-1470m)	Mar-Sep
<i>Sidalcea robusta</i> Butte County checkerbloom	SC/--/1B/--	Chaparral, cismontane woodland (90-1600m)	Apr-Jun
<i>Silene occidentalis</i> ssp. <i>longistipitata</i> Long-stiped catchfly	SC/--/1B-SI-1	Chaparral, lower/upper montane conifer forest (1000-2000m)	Jul-Aug
<i>Trichocoronis wrightii</i> var. <i>wrightii</i> Wright's trichocoronis	--/--/2/--	Meadows and seeps, marshes and swamps, riparian scrub, vernal pools/alkaline (5-435m)	May-Sep
<i>Trifolium jokerstii</i> Butte County golden clover	--/--/1B/SI-1	Valley and foothill grassland (mesic), vernal pools (50-385m)	Apr-May
<i>Vaccinium coccineum</i> Siskiyou Mountains huckleberry	--/--/3/SI-1	Lower/upper montane conifer forest/often serpentinite (1095-2135m)	Jun-Aug
<i>Wolffia brasiliensis</i> Columbian watermeal	--/--/2/--	Marshes and swamps (assorted shallow freshwater) (30-100m)	Apr-Dec
Bryophytes			
<i>Bruchia bolanderi</i> Bolander's bruchia moss	--/--/2/S	Lower/upper montane conifer forest, meadows and seeps, damp soil (600-1700m)	
<i>Mielichhoferia elongata</i> Elongate copper moss	--/--/2/SI-1	Cismontane woodland (metamorphic rock, usually vernal mesic) (500-1300m)	
Lichens			
<i>Hydrothyria venosa</i> Waterfan	--/--/--/S	Attached to rocks in cool mountain brooks and streams; submerged	
Species of Concern – CNPS List 4			
<i>Allium sanbornii</i> var. <i>sanbornii</i> Sanborn's onion	--/--/4/SI-1	Chaparral, cismontane woodland, lower montane conifer forest/ usually	May-Sep

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Table 1.1.3-1. Special status plant species with potential for occurring within the study area.

Scientific name Common name	Status FWS ¹ /State ² / CNPS ³ /PNF ⁴	Habitat (elevation)	Flowering period
		serpentinite, gravelly (260-1410m)	
<i>Arenaria "grandiflora"</i> Large-flowered sandwort	--/--/4/SI-1	Granite sand on road banks and openings in woods (500-1000m)	Apr-Aug
<i>Astragalus pauperculus</i> Depauperate milk-vetch	--/--/4/--	Chaparral, cismontane woodland, valley and foothill grassland/ vernal mesic, volcanic (60-855m)	Mar-Jun
<i>Azolla mexicana</i> Mexican mosquito fern	--/--/4/--	Marshes and swamps (ponds, slow water) (30-100m)	Aug
<i>Bulbostylis capillaris</i> Thread-leaved beakseed	--/--/4/SI-2	Lower/upper montane conifer forest, meadows and seeps (395-2075m)	Jun-Aug
<i>Clarkia mildrediae</i> ssp. <i>lutescens</i> Golden-anthered clarkia	--/--/4/SI-1	Cismontane woodland, lower montane conifer forest (openings)/ often roadcuts (275-1750m)	Jun-Aug
<i>Cypripedium fasciculatum</i> Clustered lady's slipper	SC/--/4/S	Lower montane conifer forest, north coast conifer forest/ usually serpentinite seeps and stream beds (100-2435m)	Mar-Jul
<i>Eleocharis parvula</i> Small spikerush	--/--/4/--	Marshes and swamps (1-2530m)	Jun-Sep
<i>Erigeron petrophilus</i> var. <i>sierrensis</i> Northern Sierra daisy	--/--/4/SI-2	Cismontane woodland, lower/upper montane conifer forest/ sometimes serpentinite (300-1980m)	Jun-Oct
<i>Hesperis matronalis</i> Hogwallow starfish	--/--/4/--	Valley and foothill grassland (mesic, clay) (0-505m)	Mar-Jun
<i>Lasthenia ferrisae</i> Ferris's goldfields	--/--/4/--	Vernal pools (alkaline, clay) (20-700m)	Feb-May
<i>Lilium humboldtii</i> ssp. <i>humboldtii</i> Humboldt lily	--/--/4/SI-1	Chaparral, lower conifer forest/ openings (30-1800m)	May-Jul
<i>Microseris sylvatica</i> Sylvan microseris	--/--/4/--	Chaparral, cismontane woodland, Great Basin scrub, pinyon and juniper woodland, valley and foothill grassland (serpentinite) (45-1500m)	Mar-Jun
<i>Mimulus glaucescens</i> Shield-bracted monkeyflower	--/--/4/SI-1	Chaparral, cismontane woodland, lower montane conifer forest, valley and foothill grassland/serpentinite seeps (60-1240m)	Feb-Aug
<i>Mimulus inconspicuus</i> Small flowered monkeyflower	--/--/4/--	Chaparral, cismontane woodland, lower montane coniferous forest / mesic (455-760m)	May-Jun
<i>Mimulus laciniatus</i> Cut-leaved monkeyflower	--/--/4/--	Chaparral, lower/upper montane conifer forest/ mesic, granitic (490-2650m)	Apr-Jul
<i>Navarretia cotulifolia</i> Cotula navarretia	--/--/4/--	Chaparral, cismontane woodland, valley and foothill grassland/ adobe (4-1830m)	May-Jun
<i>Navarretia heterandra</i> Tehama navarretia	--/--/4/--	Valley and foothill grassland (mesic), vernal pools (30-945m)	Apr-Jun
<i>Perideridia bacigalupii</i> Bacigalupi's yampah	--/--/4/SI-1	Chaparral, lower montane conifer forest/ serpentinite (450-1000m)	Jun-Aug
<i>Piperia colemanii</i> Coleman's rein orchid	--/--/4/--	Chaparral, lower montane conifer forest/ often sandy (1200-2300m)	Jun-Aug

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Table 1.1.3-1. Special status plant species with potential for occurring within the study area.

Scientific name Common name	Status FWS ¹ /State ² / CNPS ³ /PNF ⁴	Habitat (elevation)	Flowering period
<i>Sanicula tracyi</i> Tracy's sanicle	SC ⁶ /--/4/--	Cismontane woodland, lower/upper montane conifer forest, openings (100- 1585m)	Apr-Jul
<i>Stellaria obtusa</i> Obtuse starwort	--/--/4/--	Upper montane conifer forest/ mesic (150-2135m)	May-Oct
<i>Streptanthus drepanoides</i> Sickle-fruit jewel-flower	--/--/4/--	Chaparral, cismontane woodland, lower montane conifer forest/ serpentinite (275- 1660m)	Apr-Jun
¹ United States Fish and Wildlife Service (FWS): FE - federal endangered, FT - federal threatened, SC - federal species of concern (not a formal listing).			
² California Department of Fish and Game (DFG): SE - State endangered, SR - State rare.			
³ California Native Plant Society (CNPS): List 1B - plants rare, threatened, or endangered in California and elsewhere; List 2 - plants rare, threatened, or endangered in California but more common elsewhere; List 3 - plants about which more information is needed; List 4 - plants of limited distribution.			
⁴ Plumas National Forest (PNF): S - Sensitive; SI-1 - Special Interest category 1 (Survey and recommend conservation measures); SI-2 - Special Interest category 2 (Report occurrences and recommend conservation measures).			
⁵ FWS recognizes two subspecies of <i>Clarkia mosquinii</i> , ssp. <i>mosquinii</i> and ssp. <i>xerophila</i> , both as SC.			
⁶ Although FWS lists this species as within the vicinity of the project area, PNF and CNPS consider it to only occur in Humboldt and Trinity counties.			

1.2 DESCRIPTION OF FACILITIES

The Oroville Facilities were developed as part of the State Water Project (SWP), a water storage and delivery system of reservoirs, aqueducts, power plants, and pumping plants. The main purpose of the SWP is to store and distribute water to supplement the needs of urban and agricultural water users in northern California, the San Francisco Bay area, the San Joaquin Valley, and southern California. The Oroville Facilities are also operated for flood management, power generation, to improve water quality in the Delta, provide recreation, and enhance fish and wildlife.

FERC Project No. 2100 encompasses 41,100 acres and includes Oroville Dam and Reservoir, three power plants (Hyatt Pumping-Generating Plant, Thermalito Diversion Dam Power Plant, and Thermalito Pumping-Generating Plant), Thermalito Diversion Dam, the Feather River Fish Hatchery and Fish Barrier Dam, Thermalito Power Canal, Oroville Wildlife Area (OWA), Thermalito Forebay and Forebay Dam, Thermalito Afterbay and Afterbay Dam, and transmission lines, as well as a number of recreational facilities. An overview of these facilities is provided on Figure 1.2-1. The Oroville Dam, along with two small saddle dams, impounds Lake Oroville, a 3.5-million-acre-feet (maf)

capacity storage reservoir with a surface area of 15,810 acres at its normal maximum operating level.

The hydroelectric facilities have a combined licensed generating capacity of approximately 762 megawatts (MW). The Hyatt Pumping-Generating Plant is the largest of the three power plants with a capacity of 645 MW. Water from the six-unit underground power plant (three conventional generating and three pumping-generating units) is discharged through two tunnels into the Feather River just downstream of Oroville Dam. The plant has a generating and pumping flow capacity of 16,950 cfs and 5,610 cfs, respectively. Other generation facilities include the 3-MW Thermalito Diversion Dam Power Plant and the 114-MW Thermalito Pumping-Generating Plant.

Thermalito Diversion Dam, four miles downstream of the Oroville Dam creates a tail water pool for the Hyatt Pumping-Generating Plant and is used to divert water to the Thermalito Power Canal. The Thermalito Diversion Dam Power Plant is a 3-MW power plant located on the left abutment of the Diversion Dam. The power plant releases a maximum of 615 cubic feet per second (cfs) of water into the river.

The Power Canal is a 10,000-foot-long channel designed to convey generating flows of 16,900 cfs to the Thermalito Forebay and pump-back flows to the Hyatt Pumping-Generating Plant. The Thermalito Forebay is an off-stream regulating reservoir for the 114-MW Thermalito Pumping-Generating Plant. The Thermalito Pumping-Generating Plant is designed to operate in tandem with the Hyatt Pumping-Generating Plant and has generating and pump-back flow capacities of 17,400 cfs and 9,120 cfs, respectively. When in generating mode, the Thermalito Pumping-Generating Plant discharges into the Thermalito Afterbay, which is contained by a 42,000-foot-long earth-fill dam. The Afterbay is used to release water into the Feather River downstream of the Oroville Facilities, helps regulate the power system, provides storage for pump-back operations, and provides recreational opportunities. Several local irrigation districts receive water from the Afterbay.

The Feather River Fish Barrier Dam is downstream of the Thermalito Diversion Dam and immediately upstream of the Feather River Fish Hatchery. The flow over the dam maintains fish habitat in the low-flow channel of the Feather River between the dam and the Afterbay outlet, and provides attraction flow for the hatchery. The hatchery was intended to compensate for spawning grounds lost to returning salmon and steelhead trout from the construction of Oroville Dam. The hatchery can accommodate 15,000 to 20,000 adult fish annually.

The Oroville Facilities support a wide variety of recreational opportunities. They include: boating (several types), fishing (several types), fully developed and primitive camping (including boat-in and floating sites), picnicking, swimming, horseback riding, hiking, off-road bicycle riding, wildlife watching, hunting, and visitor information sites with cultural and informational displays about the developed facilities and the natural environment.

There are major recreation facilities at Loafer Creek, Bidwell Canyon, the Spillway, North and South Thermalito Forebay, and Lime Saddle. Lake Oroville has two full-service marinas, five car-top boat launch ramps, ten floating campsites, and seven dispersed floating toilets. There are also recreation facilities at the Visitor Center and the OWA.

The OWA comprises approximately 11,000-acres west of Oroville that is managed for wildlife habitat and recreational activities. It includes the Thermalito Afterbay and surrounding lands (approximately 6,000 acres) along with 5,000 acres adjoining the Feather River. The 5,000 acre area straddles 12 miles of the Feather River, which includes willow and cottonwood lined ponds, islands, and channels. Recreation areas include dispersed recreation (hunting, fishing, and bird watching), plus recreation at developed sites, including Monument Hill day use area, model airplane grounds, three boat launches on the Afterbay and two on the river, and two primitive camping areas. California Department of Fish and Game's (DFG) habitat enhancement program includes a wood duck nest-box program and dry land farming for nesting cover and improved wildlife forage. Limited gravel extraction also occurs in a number of locations.

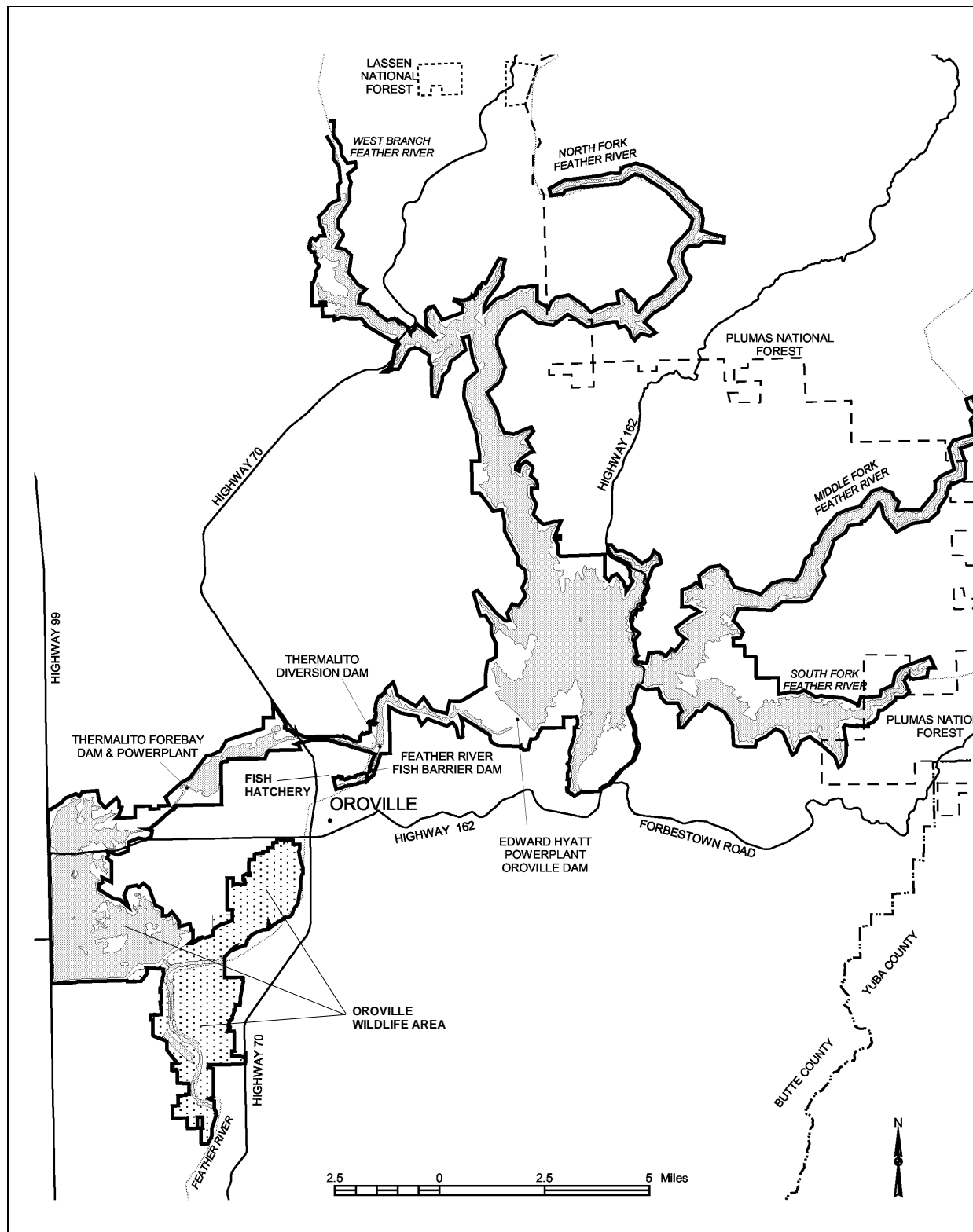


Figure 1.2-1. Oroville Facilities FERC Project Boundary

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1.3 CURRENT OPERATIONAL CONSTRAINTS

Operation of the Oroville Facilities varies seasonally, weekly and hourly, depending on hydrology and the objectives DWR is trying to meet. Typically, releases to the Feather River are managed to conserve water while meeting a variety of water delivery requirements, including flow, temperature, fisheries, recreation, diversion and water quality. Lake Oroville stores winter and spring runoff for release to the Feather River as necessary for project purposes. Meeting the water supply objectives of the SWP has always been the primary consideration for determining Oroville Facilities operation (within the regulatory constraints specified for flood control, in-stream fisheries, and downstream uses). Power production is scheduled within the boundaries specified by the water operations criteria noted above. Annual operations planning is conducted for multi-year carry over. The current methodology is to retain half of the Lake Oroville storage above a specific level for subsequent years. Currently, that level has been established at 1,000,000 acre-feet (af); however, this does not limit draw down of the reservoir below that level. If hydrology is drier than expected or requirements greater than expected, additional water would be released from Lake Oroville. The operations plan is updated regularly to reflect changes in hydrology and downstream operations. Typically, Lake Oroville is filled to its maximum annual level of up to 900 feet above mean sea level (msl) in June and then can be lowered as necessary to meet downstream requirements, to its minimum level in December or January. During drier years, the lake may be drawn down more and may not fill to the desired levels the following spring. Project operations are directly constrained by downstream operational constraints and flood management criteria as described below.

1.3.1 Downstream Operation

An August 1983 agreement between DWR and DFG entitled, "Agreement Concerning the Operation of the Oroville Division of the State Water Project for Management of Fish & Wildlife," sets criteria and objectives for flow and temperatures in the low flow channel and the reach of the Feather River between Thermalito Afterbay and Verona. This agreement: (1) establishes minimum flows between Thermalito Afterbay Outlet and Verona which vary by water year type; (2) requires flow changes under 2,500 cfs to be reduced by no more than 200 cfs during any 24-hour period, except for flood management, failures, etc.; (3) requires flow stability during the peak of the fall-run Chinook spawning season; and (4) sets an objective of suitable temperature conditions during the fall months for salmon and during the later spring/summer for shad and striped bass.

1.3.1.1 Instream Flow Requirements

The Oroville Facilities are operated to meet minimum flows in the Lower Feather River as established by the 1983 agreement (see above). The agreement specifies that Oroville Facilities release a minimum of 600 cfs into the Feather River from the

Thermalito Diversion Dam for fisheries purposes. This is the total volume of flows from the diversion dam outlet, diversion dam power plant, and the Feather River Fish Hatchery pipeline.

Generally, the instream flow requirements below Thermalito Afterbay are 1,700 cfs from October through March, and 1,000 cfs from April through September. However, if runoff for the previous April through July period is less than 1,942,000 af (i.e., the 1911-1960 mean unimpaired runoff near Oroville), the minimum flow can be reduced to 1,200 cfs from October to February, and 1,000 cfs for March. A maximum flow of 2,500 cfs is maintained from October 15 through November 30 to prevent spawning in overbank areas that might become de-watered.

1.3.1.2 Temperature Requirements

The Diversion Pool provides the water supply for the Feather River Fish Hatchery. The hatchery objectives are 52°F for September, 51°F for October and November, 55°F for December through March, 51°F for April through May 15, 55°F for last half of May, 56°F for June 1-15, 60°F for June 16 through August 15, and 58°F for August 16-31. A temperature range of plus or minus 4°F is allowed for objectives, April through November.

There are several temperature objectives for the Feather River downstream of the Afterbay Outlet. During the fall months, after September 15, the temperatures must be suitable for fall-run Chinook. From May through August, they must be suitable for shad, striped bass, and other warmwater fish.

The National Marine Fisheries Service has also established an explicit criterion for steelhead trout and spring-run Chinook salmon. Memorialized in a biological opinion on the effects of the Central Valley Project and SWP on Central Valley spring-run Chinook and steelhead as a reasonable and prudent measure; DWR is required to control water temperature at Feather River mile 61.6 (Robinson's Riffle in the low-flow channel) from June 1 through September 30. This measure requires water temperatures less than or equal to 65°F on a daily average. The requirement is not intended to preclude pump-back operations at the Oroville Facilities needed to assist the State of California with supplying energy during periods when the California ISO anticipates a Stage 2 or higher alert.

The hatchery and river water temperature objectives sometimes conflict with temperatures desired by agricultural diverters. Under existing agreements, DWR provides water for the Feather River Service Area (FRSA) contractors. The contractors claim a need for warmer water during spring and summer for rice germination and growth (i.e., 65°F from approximately April through mid May, and 59°F during the remainder of the growing season). There is no obligation for DWR to meet the rice

water temperature goals. However, to the extent practical, DWR does use its operational flexibility to accommodate the FRSA contractor's temperature goals.

1.3.1.3 Water Diversions

Monthly irrigation diversions of up to 190,000 (July 2002) af are made from the Thermalito Complex during the May through August irrigation season. Total annual entitlement of the Butte and Sutter County agricultural users is approximately 1 maf. After meeting these local demands, flows into the lower Feather River continue into the Sacramento River and into the Sacramento-San Joaquin Delta. In the northwestern portion of the Delta, water is pumped into the North Bay Aqueduct. In the south Delta, water is diverted into Clifton Court Forebay where the water is stored until it is pumped into the California Aqueduct.

1.3.1.4 Water Quality

Flows through the Delta are maintained to meet Bay-Delta water quality standards arising from DWR's water rights permits. These standards are designed to meet several water quality objectives such as salinity, Delta outflow, river flows, and export limits. The purpose of these objectives is to attain the highest water quality, which is reasonable, considering all demands being made on the Bay-Delta waters. In particular, they protect a wide range of fish and wildlife including Chinook salmon, Delta smelt, striped bass, and the habitat of estuarine-dependent species.

1.3.2 Flood Management

The Oroville Facilities are an integral component of the flood management system for the Sacramento Valley. During the wintertime, the Oroville Facilities are operated under flood control requirements specified by the U.S. Army Corps of Engineers (USACE). Under these requirements, Lake Oroville is operated to maintain up to 750,000 af of storage space to allow for the capture of significant inflows. Flood control releases are based on the release schedule in the flood control diagram or the emergency spillway release diagram prepared by the USACE, whichever requires the greater release. Decisions regarding such releases are made in consultation with the USACE.

The flood control requirements are designed for multiple use of reservoir space. During times when flood management space is not required to accomplish flood management objectives, the reservoir space can be used for storing water. From October through March, the maximum allowable storage limit (point at which specific flood release would have to be made) varies from about 2.8 to 3.2 maf to ensure adequate space in Lake Oroville to handle flood flows. The actual encroachment demarcation is based on a wetness index, computed from accumulated basin precipitation. This allows higher levels in the reservoir when the prevailing hydrology is dry while maintaining adequate flood protection. When the wetness index is high in the basin (i.e., wetness in the

watershed above Lake Oroville), the flood management space required is at its greatest amount to provide the necessary flood protection. From April through June, the maximum allowable storage limit is increased as the flooding potential decreases, which allows capture of the higher spring flows for use later in the year. During September, the maximum allowable storage decreases again to prepare for the next flood season. During flood events, actual storage may encroach into the flood reservation zone to prevent or minimize downstream flooding along the Feather River.

2.0 NEED FOR STUDY

This study is needed to comply with State and federal regulations. FESA requires evaluation and consultation to avoid take of listed species or adverse modification of their habitats. CESA also requires assessment of the proposed project's impact on listed species. CEQA and NEPA require assessment of a project's impacts on State and federally listed species and their habitats. In addition, CEQA requires an evaluation of species that have not been listed under the FESA or CESA, but meet the definition of threatened, endangered, or rare as listed in the CESA. CEQA requires evaluation of project impacts on State and Federal Species of Concern. Both federal land management agencies have an obligation to insure that project operations do not adversely affect sensitive species on federal lands. NEPA procedures and the policies of the BLM and USFS require that information about any sensitive species is available to public officials and citizens before decisions are made and before actions are taken.

Relatively little was known about the occurrence or distribution of State and federally listed species and other special status plant species of concern within the project vicinity prior to the current study. These study results are needed to provide sufficient information for these consultations and CEQA/NEPA documentation.

3.0 STUDY OBJECTIVE(S)

3.1 APPLICATION OF STUDY INFORMATION

3.1.1 Environmental Documentation

The objectives of this study were to:

- provide information on special status plant species occurrence and distribution within the study area
- provide information on potential project effects to special status plant species for use in the environmental assessment process including the consultation processes with State and federal management agencies
- provide information that can be used to identify opportunities for habitat protection and enhancement for special status species

3.1.2 Settlement Agreement

Protection, mitigation, and enhancement measures related to species formally listed under the State or Federal Endangered Species acts are current license issues rather than relicensing issues. However, this study does provide information which could be used to develop Resource Actions for the enhancement of habitats of plant species of concern.

4.0 METHODOLOGY

4.1 STUDY DESIGN

4.1.1 Review of Existing Literature

Information on special status plant species that have potential for occurring in the study area (Table 1.1.3-1) were compiled from a variety of sources. Rare plant descriptions and distributions were obtained from CNDDDB records, a review of the CNPS's Inventory (CNPS 2001), *Manual of the Vascular Plants of Butte County California* (Oswald 1994), *The Jepson Manual* (Hickman 1993), *Lichens of North America* (Brodo 2001), other State and/or County biological survey records, web based and printed articles and discussions with local authorities. The California State University Chico (CSUC) Biological Sciences Herbarium database was queried for local habitat and range information (CSUC 2003). A reference guide to local vernal pool plant species was produced for field use. Photographs and keys to species identification for this guide were taken from a CD-Rom program on *Vernal Pool Plants of the Northern Sacramento Valley* by Schlising and Warren (1999). Reference material was produced each month for field personnel using a CD-Rom program with photographs of *Selected Plants of Northern California and Adjacent Nevada* by Oswald (2002). Aerial photographs, soils maps, and vegetation maps (DWR 2003) were used to predict special status species plant habitats within the study area.

4.1.2 Field Surveys

Prefield surveys: In order to familiarize themselves with individual species morphology and ecology, botanical staff (Appendix A) examined specimens in the CSUC Biological Sciences Herbarium; visited extant populations; and reviewed literature, field guides, and photographs. Extant populations of target species, if available, were visited during the appropriate identification period. Field maps were produced from enlarged aerial photographs and topographic maps.

Field Surveys: Survey guidelines issued by the DFG (2000), USFWS (1996), and the CNPS (2001) were reviewed. Botanical surveys were conducted in a manner that would locate any special status plant species within selected portions of the study area. This included all available habitats for "listed species" (i.e., vernal pools and serpentine soils). All grasslands around the Thermalito Complex within the project area were surveyed. All serpentine outcrops and adjacent areas were surveyed. Surveys were conducted during the time of year when the target species were identifiable. Local reference sites were visited if possible to familiarize botanists with the species, species habitat, and to determine species current phenological stage for field identification. Surveys for special status species, other than those officially listed as threatened, endangered, or rare species by the USFWS and the DFG, were focused in areas where

project impacts are likely to occur and within 150 feet of all project facilities (Figures 4.1.2-1, 4.1.2-2, 4.1.2-3, and 4.1.2-4). Species surveys for BLM and USFS Sensitive and Special Interest species included federal lands within the study area, adjacent federal lands outside the study area, and adjacent State lands. Areas that were inaccessible due to the steepness of terrain and thickness of vegetation were not surveyed. The number of days and hours spent on field surveys is presented in Appendix B.

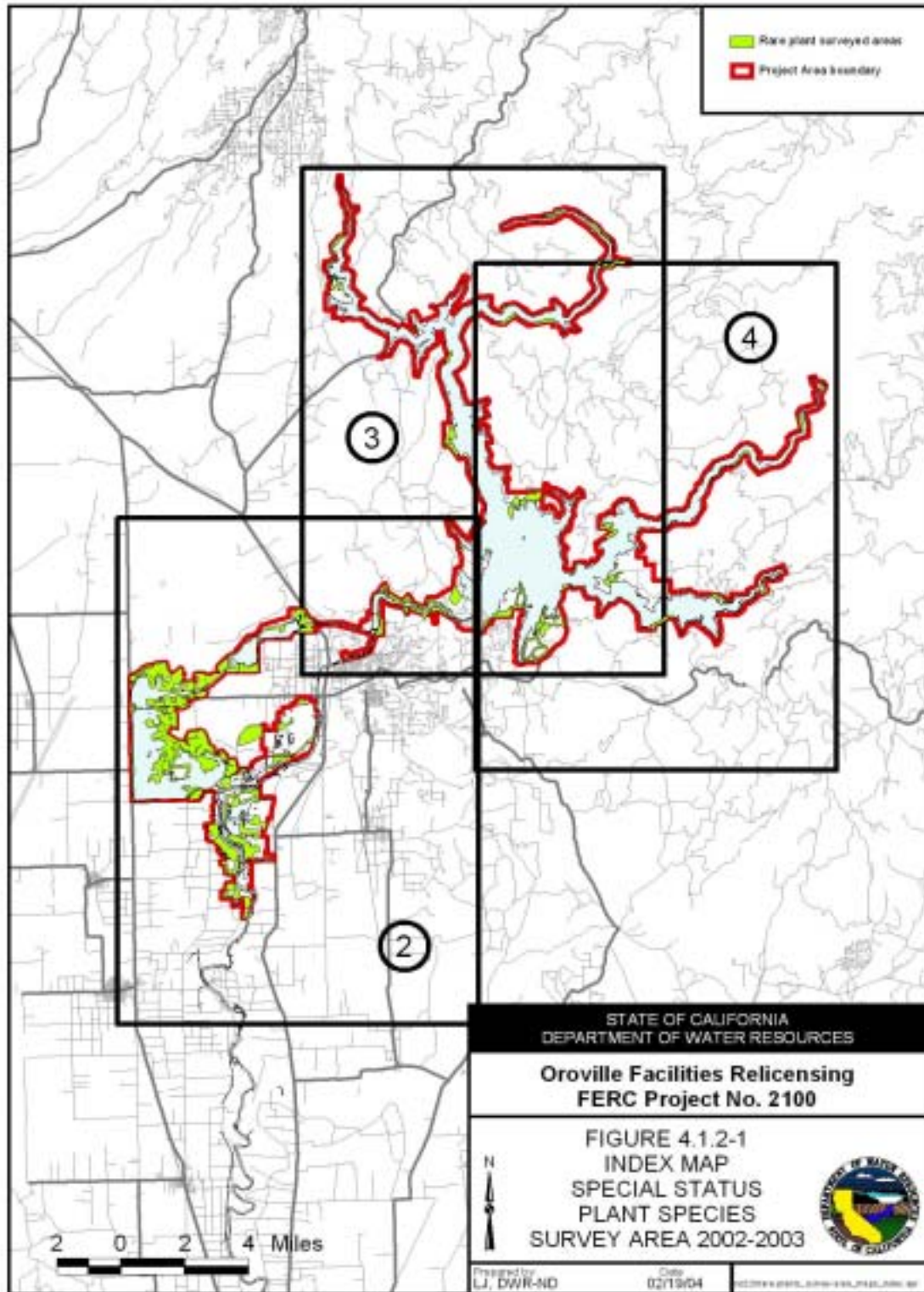


Figure 4.1.2-1. Special Status Plant Species – Survey Areas 2002/2003

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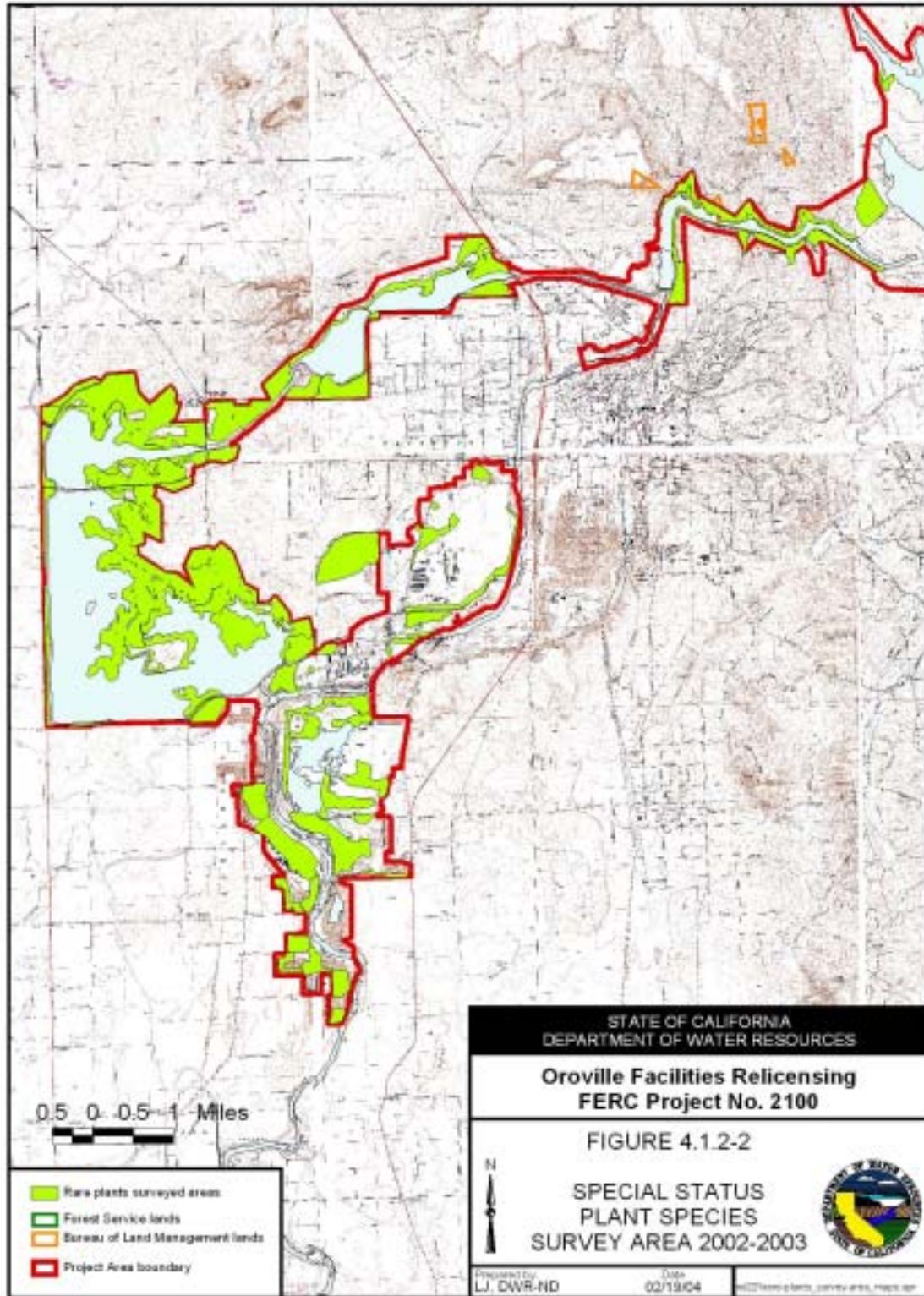


Figure 4.1.2-2. Special Status Plant Species – Survey Areas 2002/2003

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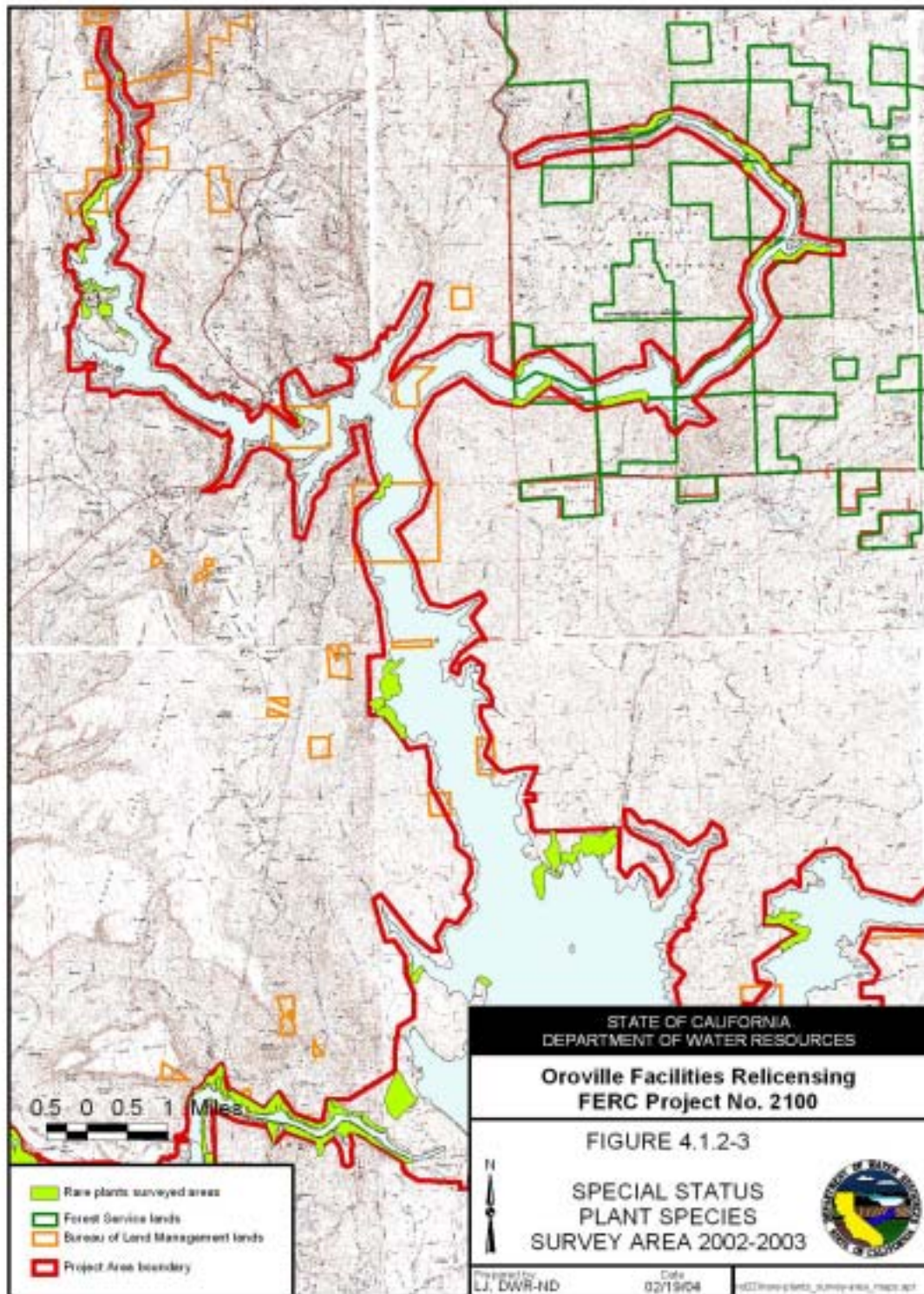


Figure 4.1.2-3. Special Status Plant Species – Survey Areas 2002/2003

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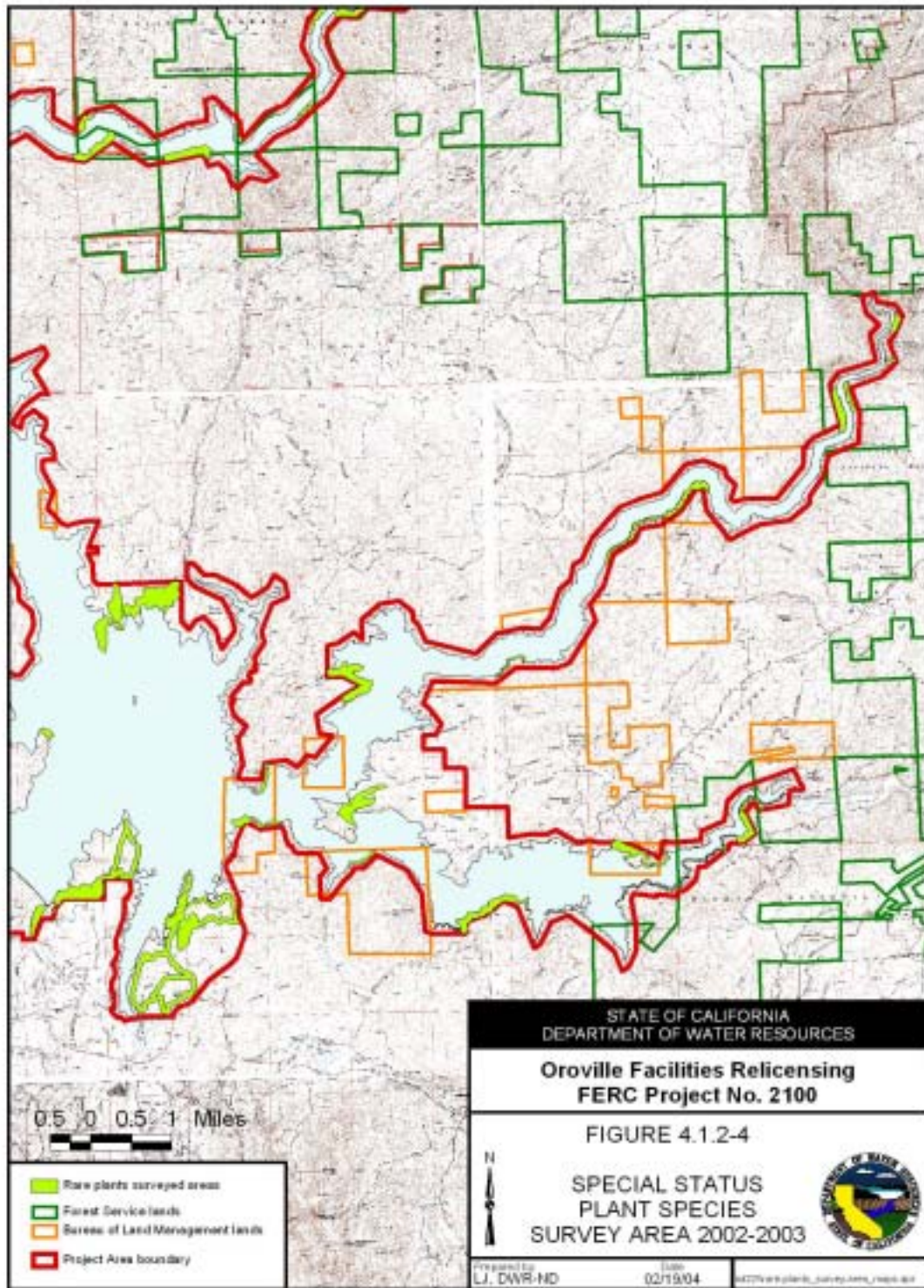


Figure 4.1.2-4. Special Status Plant Species – Survey Areas 2002/2003

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Oroville Facilities Relicensing Team

March 19, 2004

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Surveys for each of the target plant species were conducted during the appropriate time of year (i.e., time of year when species were identifiable) and on all potential habitats present within the study area. Some areas required multiple visits due to differences in phenological stages of the target species. Surveys were conducted during 2002 and 2003. In 2002, surveys began in late May and were conducted around a limited number of project features. Vernal pools were surveyed in June and July for summer flowering species (i.e. Hoover's spurge, hairy Orcutt grass, slender Orcutt grass, and Greene's tuctoria). No surveys for Butte County meadowfoam, Layne's ragwort (a serpentine /gabbroic endemic), or Hartweg's golden sunburst (extirpated along Feather River near Yuba City) were conducted during the 2002 season. In 2003, special status plant species surveys began in late February and continued through September. Surveys were not conducted for Hartweg's golden sunburst in the project area. This species is known from the San Joaquin Valley. A historic population of Hartweg's golden sunburst was documented on the bank near the junction of the Yuba and Feather rivers. However, this type locality which is approximately 26 miles south of the project area has been extirpated. Surveys for Hartweg's golden sunburst were conducted during March and April of 2003 along the Feather River downstream of the project area during riparian/cottonwood and vegetation mapping studies.

Areas with high potential for supporting threatened, endangered, or rare species were completely surveyed. All grasslands and serpentine rock outcrop and adjacent soils were surveyed for vernal pool and serpentine endemic species. Layne's ragwort is endemic to serpentine and gabbro soils. No gabbro soils were identified from the geology maps used to plan the field studies. Thus prior to the 2002 and 2003 field seasons, it was believed that no gabbro soils occurred in the Project area. Surveys for Layne's ragwort were conducted only on the serpentine areas along the North Fork and the West Branch of Lake Oroville. Early in 2004 it was brought to our attention that 1975 geology maps showed gabbroic intrusions south of the South Fork arm of the Lake. Upon examination, we discovered that this intrusion crossed both east and west of Stringtown Mountain along the South Fork. This intrusion is the same as that on which the nearest location of Layne's ragwort occurs. This occurrence is approximately five air miles from the Project area. This habitat will be surveyed during the 2004 field season.

Suitable habitats within 150 feet of all project facilities were surveyed for all other target species. Project facilities included recreation sites, roads, trails, facilities, power lines, conveyance canals, and other areas of ground disturbance. Field surveys were floristic in nature (i.e., all species observed were identified to the lowest possible taxonomic level. Reference material used for identification of species includes *The Jepson Manual: Higher Plants of California* (Hickman 1993), *Manual of the Vascular Plants of Butte County, California* (Oswald 1994), and *Plumas County and Plumas National Forest Flora* (Clifton 2002; Clifton 2003). Nomenclature follows that of *The Jepson Manual* Species were identified in the field whenever possible. If a non-listed species was not readily identifiable in the field, it was collected for later identification at the

CSUC Herbarium. At least one person in each survey crew had a current collecting permit from the Habitat Conservation Planning Branch of DFG. Samples were not collected if it was felt that it would jeopardize the continued existence of that population. Voucher specimens were made for many of the non-federally or -State listed species for deposition into the CSUC Herbarium. Information was collected on number of plants, habitat characteristics, and species composition. When a target species was located, photographs and site information was taken.

4.1.3 Mapping and Data Management

Data from field maps were entered into GIS. A California Native Species Field survey form and map will be submitted to the CNDDDB for each occurrence of the target species found within the study area. Specific location maps will be available for USFWS and DFG review as well as federal land management agencies. General area maps will be included in this report due to the sensitivity of rare plant populations. A list was compiled of all aquatic and terrestrial plant species encountered during these surveys.

5.0 RESULTS

5.1 STUDY RESULTS

5.1.1 Review of Existing Literature

A review of existing literature and databases indicates the project study area may support six federally and/or State listed plant species within the Oroville Facilities project area and another endangered species along the Feather River near Yuba City. An additional 42 vascular plant species of concern; 2 moss species, and 1 lichen species have potential for occurring in the project study area. These species of concern include former USFWS Category 2 candidate species and species of concern to USFS, BLM, and/or CNPS. The study area may support 23 additional species listed by the California Native Plant Society as List 4 species or by USFS as Special Interest species. These plants are considered to be limited in distribution and may warrant a higher listing in the future.

There are no known occurrences of federal or State listed endangered, threatened, or rare plant species within the study area. Five of the six listed species that have potential to occur in the project vicinity are associated with vernal pools or ephemeral drainages in the Central Valley. These include the Butte County meadowfoam, hairy Orcutt grass, slender Orcutt grass, Greene's tuctoria, and Hoover's spurge. Layne's ragwort occurs in the eastern foothills of the Central Valley on serpentine and gabbroic soils. A seventh species, Hartweg's golden sunburst, occurs on clay soils in annual grassland and open woodland habitats. Although this species is now known only from the San Joaquin Valley, it historically occurred along the Feather River near Yuba City (the type locality).

Six plant species of concern were known to occur within the project boundary prior to the 2002/2003 surveys. These include Mosquin's clarkia, Ahart's dwarf rush, fox sedge, four-angled spikerush, Butte County calycadenia, and Brandegees' clarkia. Status, species information, and habitat requirements for special status plant species that have potential to occur in the project area are provided in Table 1.1.3-1.

5.1.2 Field Surveys

No State or federally "listed" species were found within the study area during the 2002 and 2003 surveys. Habitat for the listed vernal pool plant species does exist in the Project area around the Thermalito Complex. Habitat for Layne's ragwort occurs in the Project area on serpentine and gabbro derived soils.

Other special status plant species that were found within the study area include twelve species listed as species of concern by USFWS, sensitive by the USFS and/or List 1B,

2, or 3 by CNPS. These include Butte County calycadenia (*Calycadenia oppositifolia*), fox sedge (*Carex vulpinoidea*), Brandegee's clarkia (*Clarkia biloba* ssp. *brandegeae*), white-stemmed clarkia (*Clarkia gracilis* ssp. *albicaulis*), Mosquin's clarkia (*Clarkia mosquinii*), four-angled spikerush (*Eleocharis quadrangulata*), Butte County fritillary (*Fritillaria eastwoodiae*), Ahart's paronychia (*Paronychia ahartii*), Sanford's arrowhead (*Sagittaria sanfordii*), and cut-leaved ragwort (*Senecio eurycephalus* var. *lewisrosei*). Seven of these species are included on the USFS Sensitive Plants list. Mapped occurrences of these species are presented in Appendix C. Due to the sensitive nature of special status species locations, a buffer around each occurrence was used to obscure the exact location. Five species listed as USFS Special Interest and/or CNPS List 4 were also found within the study area (Appendix D). These include Humboldt lily (*Lilium humboldtii* spp. *humboldtii*), Sylvan microseris (*Microseris sylvatica*), shield-bracted monkeyflower (*Mimulus glaucescens*), small-flowered monkeyflower (*Mimulus inconspicuus*), and sickle-fruit jewel-flower (*Streptanthus drepanoides*).

5.1.3 Threatened and Endangered Species Habitat - Vernal Pools

Although no "listed" vernal pool plant species were found in the Project area during these surveys, habitat does exist around the Thermalito Forebay and Afterbay. Vernal pools and swale complexes are a common part of the valley grassland habitats in this area. These pools are of the Northern Hardpan type and occur in complexes in areas of hummocky ground on terrace-alluvial derived Redding soils (DFG 1998). The Northern Hardpan pools are most threatened by urban expansion, agriculture, and long-term intensive grazing.

Approximately 49 acres of vernal pools, ephemeral swales, and pool/swale complexes containing vernal pool plant species were mapped within the Project boundary. The majority of these occur around the Thermalito Afterbay however a small number of pool/swale complexes occur near the Forebay (Figures 5.1.3-1, 5.1.3-2, and 5.1.3-3). Pools in this area range in size from very small (<3 ft diameter) to larger pools of nearly an acre. Multi-pool complexes within the project area range in size from 0.5 to 5 acres. The majority of pools are fairly shallow, although large deep pools were also found (Figure 5.1.3-4). In winter, the pools fill with rain. As temperatures rise in February and March, water levels begin to decrease, stimulating germination and growth of early vernal pool plants. During 2003, the pools filled in winter. Spring rains and cooler weather extended the growing period for the spring flowering species well into May.

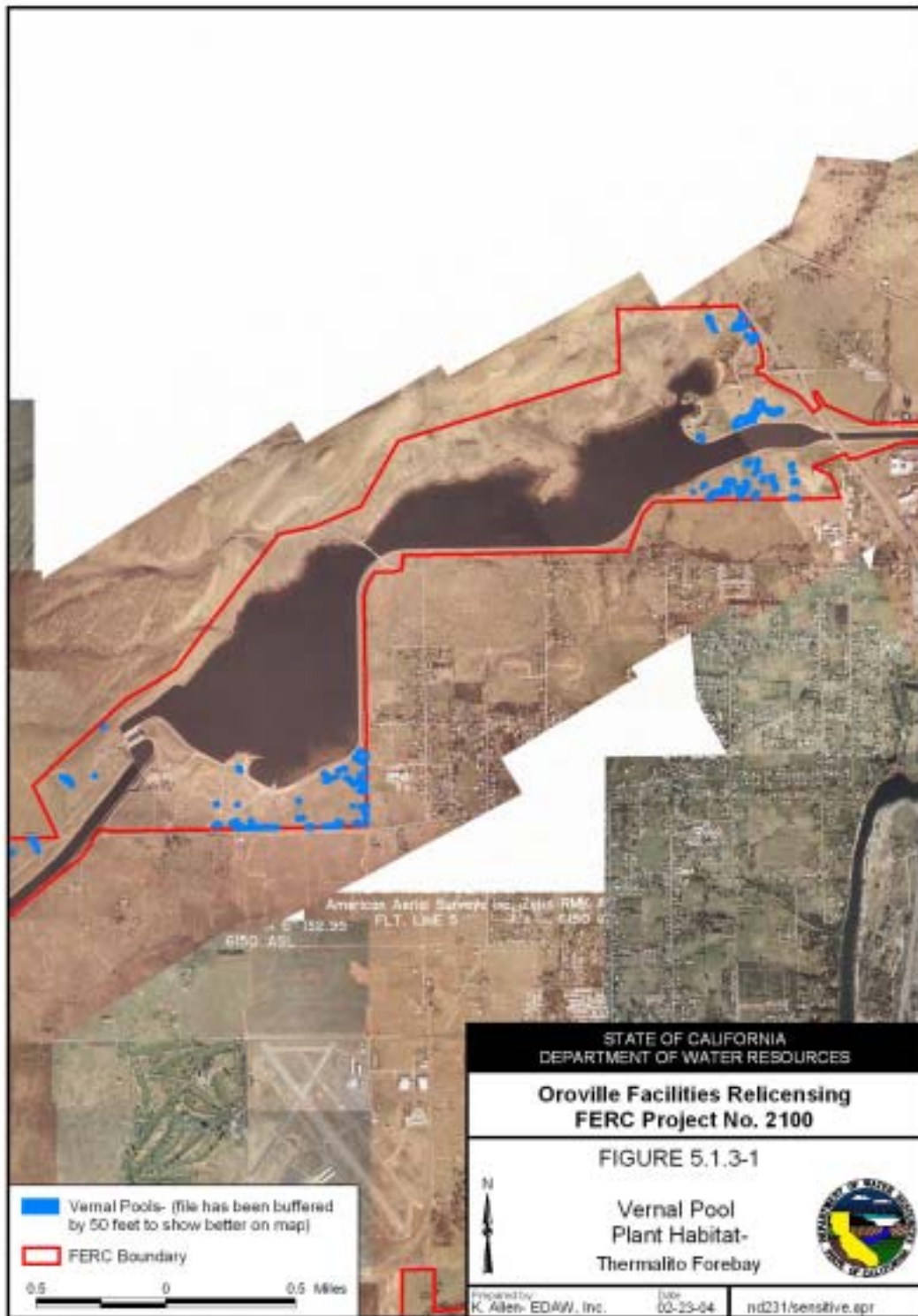


Figure 5.1.3-1. Vernal Pools – Thermalito Forebay Area.

Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only



Figure 5.1.3-2. Vernal Pools – North Thermalito Afterbay Area

Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only

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Figure 5.1.3-3. Vernal Pools – South Thermalito Afterbay Area.

Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only



Figure 5.1.3-4. Vernal pools in the project area.

White meadowfoam (*Limnanthes alba* ssp. *alba*) and rosy meadowfoam (*Limnanthes douglasii* ssp. *rosea*) are closely related species with similar habitats and flowering periods to the Butte County meadowfoam. White meadowfoam was a common early spring inhabitants of ephemeral drainages and pools throughout the area. Rosy meadowfoam, although not as common as the white meadowfoam, was also found in ephemeral drainages and pools in the area. As the season progressed, other annual vernal pool endemics began to flower, often forming concentric rings around the pools. Some of the most abundant species observed during the surveys were goldfields (several *Lasthenia* spp.), popcorn flowers (*Plagiobothrys stipitatus* var. *micranthus*, *P. greenei*), white flowered navarettia (*Navarettia leucocephala* ssp. *leucocephala*), Sacramento Valley pogogyne (*Pogogyne ziziphoroides*), and woolly marbles (*Psilocarphus* spp.). Widespread, less showy species included common toad rush (*Juncus bufonius* var. *bufonius*) and leafy-bracted dwarf rush (*J. capitatus*).

Larger, deeper pools hold water longer. This is particularly true for pools with clay soils. Plants not common or absent in shallower pools were found in pools of this type within the project area in mid- to late spring. The most commonly found species were several downingias (*Downingia ornatissima*, *D. cuspidata* var. *cuspidata*, *D. bicornuta* var. *bicornuta*, *D. bella*), coyote thistle (*Eryngium castrense*), and the grasses vernal pool foxtail (*Alopecurus saccatus*) and annual hairgrass (*Deschampsia danthoniodes*). Deep vernal pools with clay beds are preferred habitat for the summer-flowering State and federally listed hairy Orcutt grass (*Orcuttia pilosa*), slender Orcutt grass (*Orcuttia tenuis*), and Greene's tuctoria (*Tuctoria greenei*) which appear as the pools are drying down. Although a few deep vernal pools exist within the project area, none of these summer-flowering grass species were found. Likewise, the federally threatened, summer flowering Hoover's spurge (*Chamaesyce hooveri*), is known to prefer deep pools with little plant cover in the bottom. A few pools within the project area fit this description. No Hoover's spurge was found during summer surveys.

5.1.4 Threatened and Endangered Species Habitat – Serpentine and Gabbroic Soils

The federally and State “listed” Layne’s ragwort (also known as Layne’s butterweed) is endemic to soils derived from serpentine and gabbro rock. The gabbro soils tend to be mildly acidic and are rich in iron and magnesium and often contain other heavy metals such as chromium. Serpentine-derived soils tend to have low levels of nitrogen, phosphorus, and calcium, combined with high levels of magnesium and potentially toxic elements such as nickel, chromium and cobalt. These conditions make for a harsh environment and many plant species do not grow well under these conditions (USFWS 2002a). These soil types support unique assemblages of plant species with many endemic species. Both serpentine and gabbro soils occur in the Project area (Figures 5.1.4-1, 5.1.4-2, and 5.1.4-3).

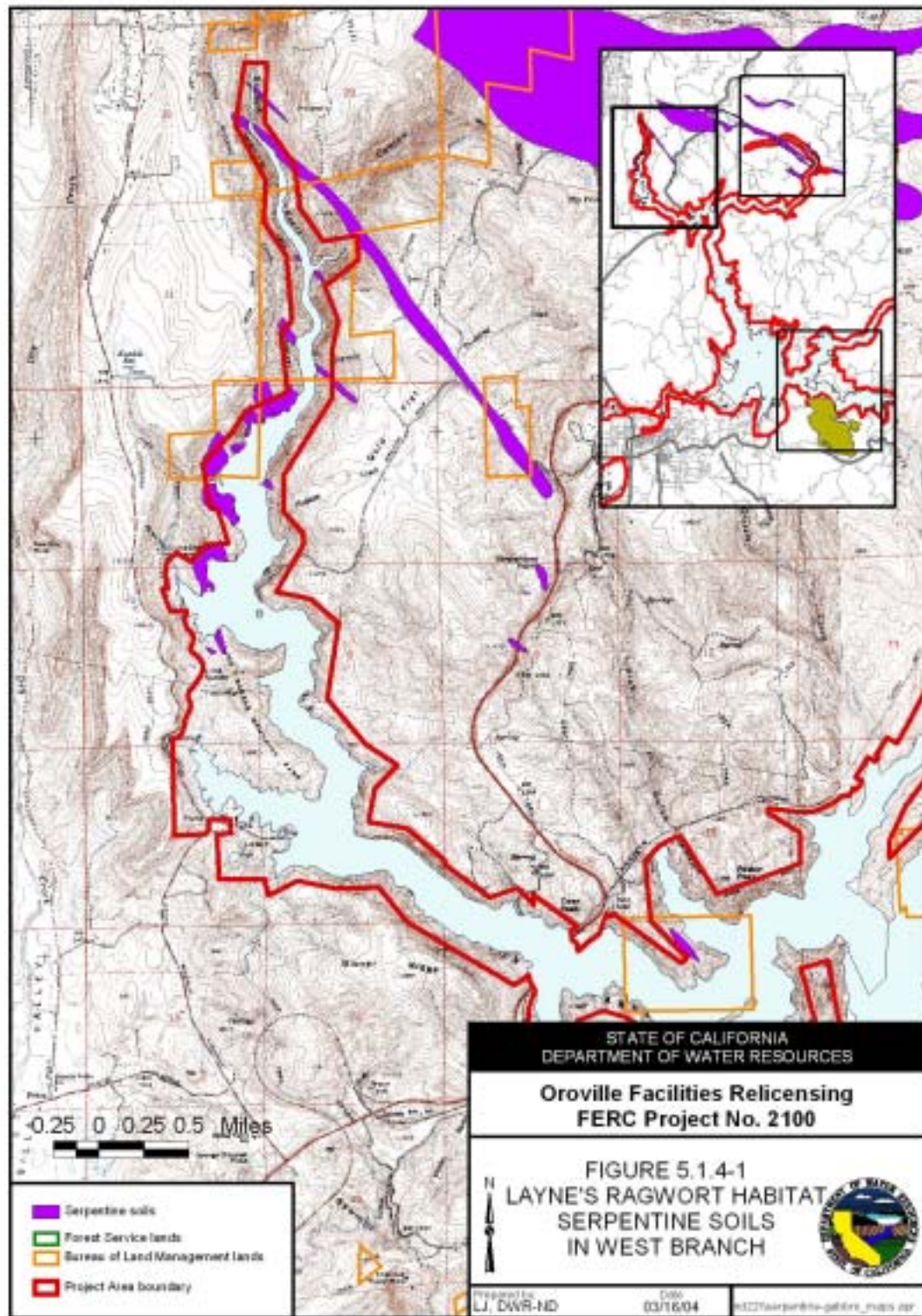


Figure 5.1.4-1. Serpentine soils/Layne's ragwort habitat along West Branch.

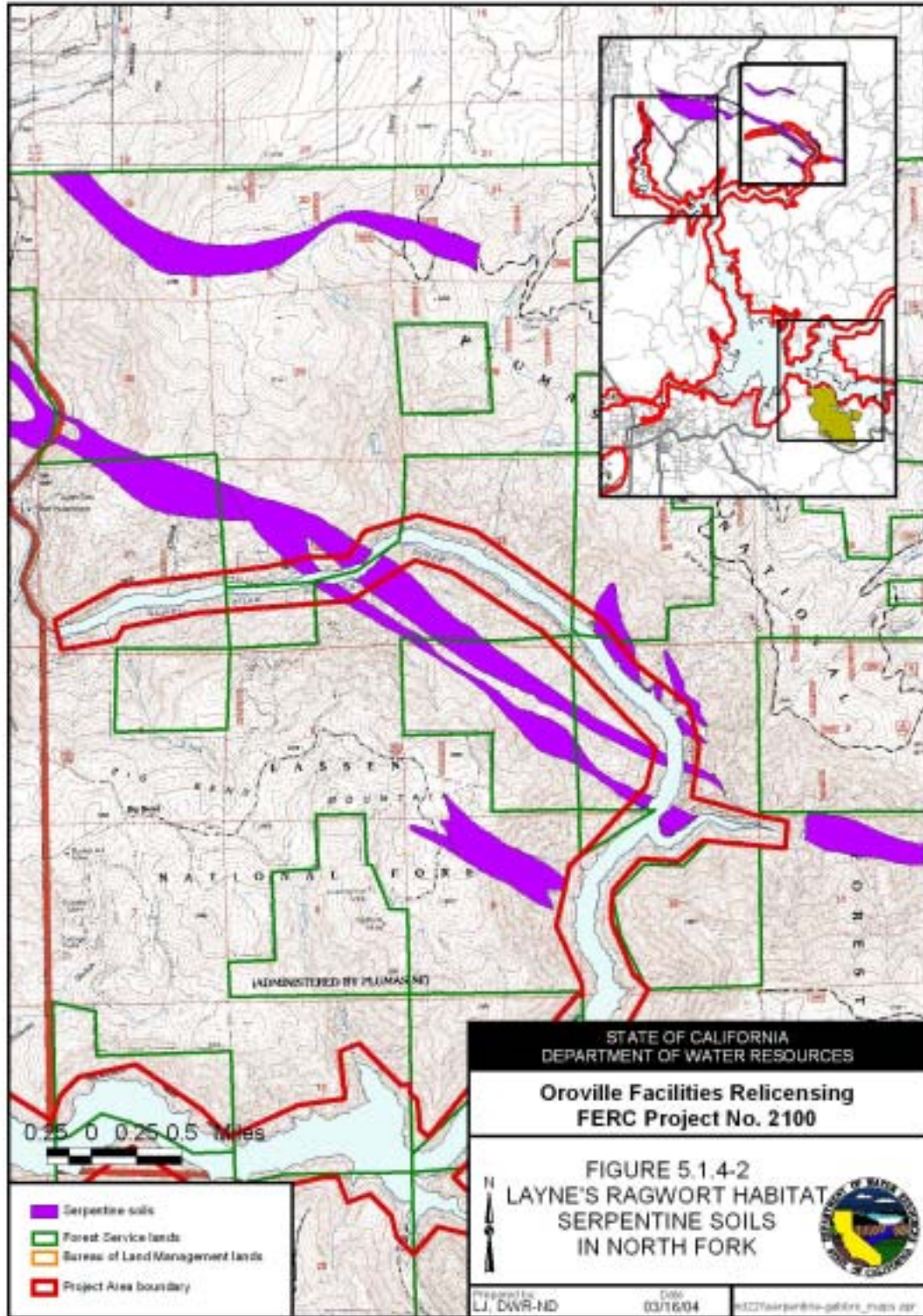


Figure 5.1.4-2. Serpentine soils/Layne's ragwort habitat along North Fork.

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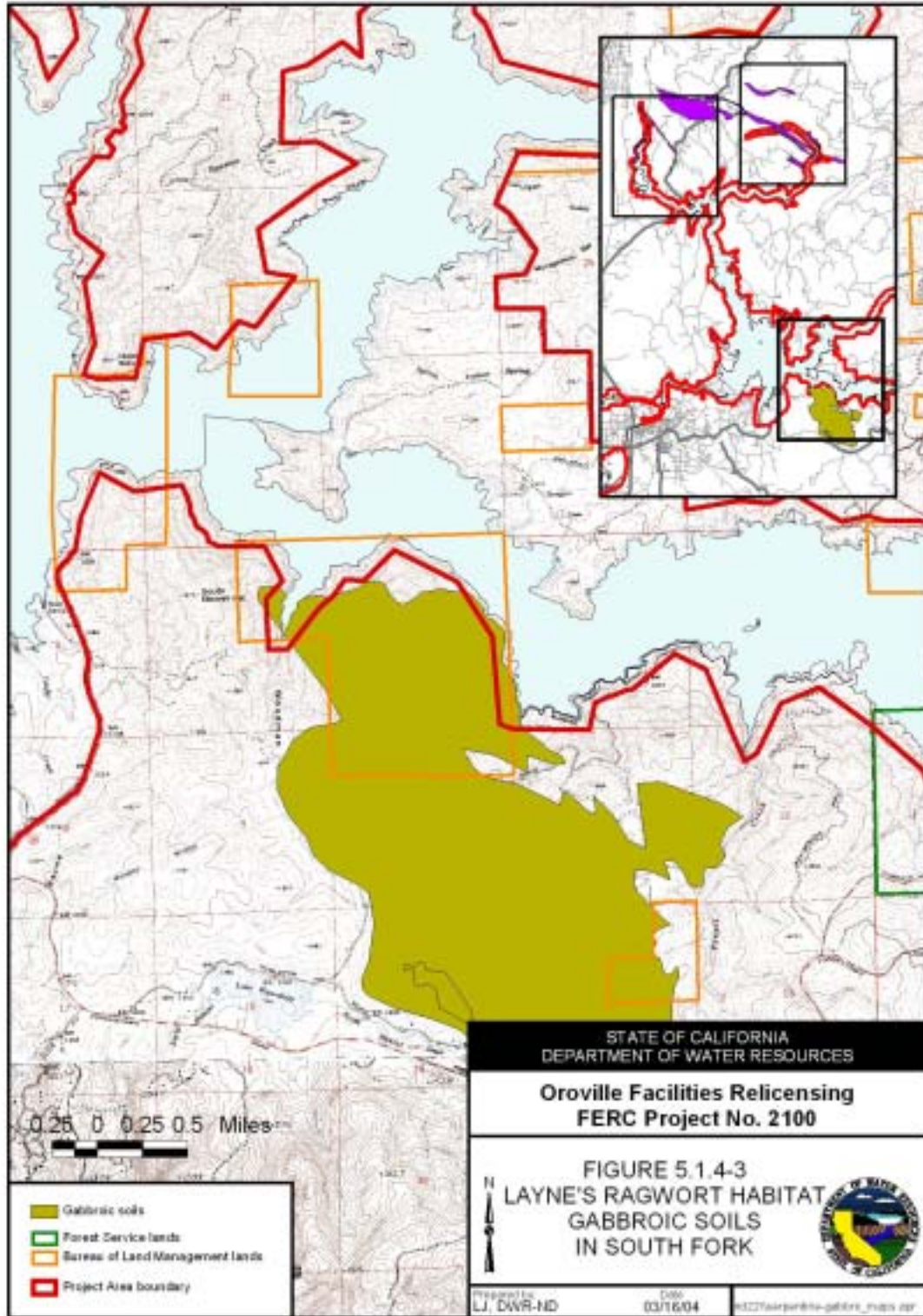


Figure 5.1.4-3. Gabbro soils/Layne's ragwort along South Fork.

5.1.4.1 *Serpentine habitat*

Approximately 172 acres of serpentinite and serpentine-derived soils occur in the Project area. Numerous northwest to southeast trending bands of serpentine occur in the North Fork (87 acres) and West Branch (85 acres) arms of Lake Oroville. These outcrops harbor many endemic species including the closely related species, cut-leaved ragwort (*Senecio eurycephalus* var. *lewisrosei*) and the Butte County calycadenia (*Calycadenia oppositifolia*) (Figure 5.1.4.1-1). Both species are on the CNPS List 1B. No Layne's ragwort was found on these soils during the 2002 and 2003 surveys.



Figure 5.1.4.1-1. Serpentine/ vegetation in the Project area.

5.1.4.2 *Gabbro habitat*

Approximately 64 acres of gabbro and gabbro-derived soils occur in the Project Area. These gabbro intrusions were not identified on the geology maps used to plan the field studies. Thus prior to the 2002 and 2003 field seasons, it was believed that no gabbro soils occurred in the Project area. Surveys for Layne's ragwort were conducted only on the serpentine areas along the North Fork and the West Branch of Lake Oroville. Early in 2004 it was brought to our attention that 1975 geology maps showed gabbroic intrusions south of the South Fork arm of the Lake. Upon examination, we discovered that a small section occurred both east and west of Stringtown Mountain along the South Fork. This intrusion is the same as that on which the nearest location of Layne's ragwort occurs. This occurrence is approximately five air miles from the Project area. Surveys will be conducted this spring for Layne's ragwort in this area.

5.1.5 Federal and State Listed Species

Butte County meadowfoam (*Limnanthes floccosa* ssp. *californica*) is an annual herb in the false mermaid family (Limnanthaceae). It is both a federal and State endangered species. This species appears in late March to early May in ephemeral drainages, vernal pool depressions in ephemeral drainages, and occasionally around the edges of isolated vernal pools. This species is found most often in vernal moist rocky drainages and often not in discrete vernal pools. It is restricted to a narrow 25-mile strip along the eastern margin of the Sacramento Valley in Butte County at elevations of 165 ft (50m) to 297 ft (90m).

Sixteen of the 18 remaining populations of Butte County meadowfoam occur on private land and are subject to urban development, agricultural land conversion, and highway widening or realignment. This species has two centers of distribution; near the type locality approximately five miles north of the Project area, and in and around the city of Chico. Of the 11 populations that occur in the Chico area, 8 are entirely on private land and zoned for urban development. The remaining populations in this area occur on City-owned property surrounding the Chico Airport and could be impacted due to airport maintenance activities (Fed. Register, March 26, 1997). The seven remaining populations occur from just north of State Route 149 south to the type locality off Shippee Road. Two of these populations (including the type locality) are known from approximately five miles north of the Thermalito Afterbay. All seven of these populations are immediately adjacent to paved roads, and in areas that could be subject to “ranchette” development and or conversion to agricultural lands.

Approximately 49 acres of vernal pools, ephemeral drainages, and pool/swale complexes were mapped in the Project area in the grasslands around the Thermalito Complex. Many of these ephemeral drainages could potentially support the Butte County meadowfoam, although the number of acres of suitable habitat for this species has not been quantified. White meadowfoam (*Limnanthes alba* ssp. *alba*) and rosy meadowfoam (*Limnanthes douglasii* ssp. *rosea*), closely related species with similar habitats, were common inhabitants of ephemeral drainages and pools throughout this area. Although no Butte County meadowfoam was found during the 2003 surveys, suitable habitat for this species exists within the study area in the grasslands around the Thermalito Complex.

Hairy Orcutt grass (*Orcuttia pilosa*) is an annual herb in the grass family (Poaceae). It is both a federal and State listed endangered species. It occurs from May to September in drying vernal pools along the eastern margin of the Central Valley. It is known from Butte, Glenn, and Tehama counties in the Sacramento Valley and Stanislaus, Merced, and Madera counties in the San Joaquin Valley at elevations of 83 ft (25m) to 412 feet (125 m).

According to current CNDDDB records, 12 of the 40 recorded populations of hairy Orcutt grass are believed to be extirpated due to agricultural land conversion, urbanization, and intensive cattle grazing (Federal Register, March 26, 1997). Hairy Orcutt grass was believed to be extirpated from Merced County, however, a new location was recently reported in eastern Merced County. Sixteen of the remaining populations occur in the Sacramento Valley, nine of which are found in Tehama County, one in Butte County, and six in Glenn County. Except for the six populations found at the Sacramento National Wildlife Refuge in Glenn County and one on Bureau of Reclamation land in Madera County, all are on private lands which include six populations at the Nature Conservancy's Vina Plains Preserve in Tehama County. The Butte County population is within eight miles of the project boundary.

Conversion of vernal pool habitat to agricultural and urban uses is identified as the primary factor leading to the decline of this species (USFWS 2002a). Other threats include highway expansion projects, discing, off-highway vehicle use, and competition from nonnative weeds. Livestock grazing may or may not adversely affect this species, depending on types, season of use, grazing duration, and intensity. As long as irrigation is not used, moderate grazing regimes appear to have little impact (USFWS 2002a).

Hairy Orcutt grass is found most often in the drying bottoms of large deep vernal pools. A few deep vernal pools exist within the Project area and could support this species.

Slender Orcutt grass (*Orcuttia tenuis*) is an annual herb in the grass family (Poaceae). It is listed as a federally threatened species and a California endangered species and is found in drying vernal pools from May to October. It is restricted to northern California and occurs in disjunct populations from Siskiyou County to Sacramento County (USFWS 2002a). Most of the 75 extant populations (CNDDDB) are in Shasta and Tehama counties. It is also found in Butte, Lake, Sacramento, Siskiyou, Plumas, Lassen, and Modoc counties. In 2000, two occurrences of slender Orcutt grass were found near Hwy 70 and Palermo Road within 1/3 mile of the Project area.

Although new populations discovered recently have extended its range, the overall trend is one of decline due to habitat alteration and loss (Federal Register, March 26, 1997). Conversion of vernal pool habitat to agricultural and urban uses is identified as the primary factor leading to the decline of this species (USFWS 2002a). Other threats include highway expansion projects, discing, off-highway vehicle use, and competition from nonnative weeds. Livestock grazing may or may not adversely affect this species, depending on types, season of use, grazing duration, and intensity.

Slender Orcutt grass is found most often in the drying bottoms of large deep vernal pools. A few deep vernal pools exist within the Project area and could support this species.

Greene's tuctoria (*Tuctoria greenei*) is an annual herb in the grass family (Poaceae). It is listed as a federally endangered species and a California rare species. This species occurs from May to July along the eastern margin of the Central Valley and one population on the Modoc Plateau. Greene's tuctoria occupies small or shallow vernal pools, ones which tend to dry more quickly. Larger pools that support this species tend to be shallow or if deeper, the species is found only along the margin. Greene's tuctoria can be found from May to September.

According to current CNDDDB records, 19 of the 41 recorded occurrences of Greene's tuctoria have been extirpated due to habitat conversion by agriculture, urbanization, and grazing. Of the 22 extant populations, 4 are found in Butte County, 10 in Tehama County, 7 in Merced County, and 1 in Shasta County. Greene's tuctoria is believed to have been extirpated from Stanislaus, San Joaquin, Madera, Fresno, and Tulare counties.

All populations of Greene's tuctoria are on private lands and subject to cattle grazing. Four of these occurrences are on the Nature Conservancy's Vina Plains Preserve. One population occurs just west of Hwy 99 within 300 yards (Schlising and Sanders 1983) and another within 5 miles of the project boundary. Suitable habitat for this species exists within the study area.

Hoover's spurge (*Chamaesyce hooveri*) is a federally listed threatened species. This prostrate annual herb in the spurge family (Euphorbiaceae) is found in relatively large, deep dried vernal pools on the eastern margin of the Central Valley from July to August. It typically inhabits areas with barren soils within the pools. It occurs in Tehama, Butte, Glenn, Stanislaus, Tulare, and Merced counties.

According to current CNDDDB records, 4 of the 30 occurrences of Hoover's spurge have been extirpated. There are 26 known populations of Hoover's spurge from Tulare, Merced, Stanislaus, Glenn, Butte, and Tehama counties, 14 of which occur near the Butte-Tehama county line. Three of the populations are in Glenn County in the Sacramento National Wildlife Refuge and two occur in DFG's Stone Corral Ecological Reserve in Tulare County. Twenty-one of the occurrences (four at TNC's Vina Plains Preserve) are on private property and are threatened by cattle grazing. The nearest occurrence of Hoover's spurge is approximately eight miles north of the project boundary near the Pentz Rd/Hwy 99 intersection. Suitable habitat for this species exists within the study area.

Hartweg's golden sunburst (*Pseudobahia bahifolia*) is an annual herb in the sunflower family (Asteraceae). It is a federally and State listed endangered species. This species is found on clay soils in annual grasslands and open woodlands. It typically inhabits upland sites in association with undulating mima mound topography formed on acidic soils (Dittes et al. 2002). It flowers from March through April. The historic range of this species is from Yuba, Madera, Stanislaus, Fresno, and Merced counties.

According to current CNDDDB records, 4 of the 24 occurrences have been extirpated. The remaining populations are in Madera, Fresno, Merced, and Stanislaus counties. Hartweg's golden sunburst was known in Yuba County from the floodplain of the lower Feather River. A historic population of Hartweg's golden sunburst was documented on the bank near the junction of the Yuba and Feather rivers. This type locality has been extirpated. There is little probability of finding this plant within the study area.

Layne's ragwort (*Senecio layneae*) is a federally threatened and California rare species. It is a perennial herb in the sunflower family (Asteraceae) and flowers from April to July. It is found in open rocky areas of serpentine and gabbroic derived soils within chaparral and chaparral/open pine or oak woodlands at elevations of 660 feet (200m) to 3300 feet (1000 m).

There are 47 records of Layne's ragwort identified in the CNDDDB from El Dorado, Tuolumne, and Yuba counties. Four of these are thought to have been extirpated. Most of the known sites are scattered within a 40,000 acre area in El Dorado County. Two populations occur in Yuba County near Brownsville approximately five air miles from the Project area. These two occurrences are on BLM lands that are leased to the local community. The gabbro soils in this area arise from the same gabbro intrusion as that which occurs along the South Fork of Lake Oroville.

This species is most threatened by residential and commercial development road maintenance, change in fire frequency, off-road vehicle use, and competition with non-native vegetation (USFWS 2002a). A Recovery Plan for Gabbro Soil Plants of the Central Sierra Nevada Foothills (USFWS 2002b) includes the protection of Layne's ragwort. This recovery plan primarily focuses on the threatened and endangered species growing on the Pine Hill Formation in El Dorado County.

5.1.6 Special Status Species Found Within Study Area – CNPS Lists 1, 2, and 3

Butte County calycadenia (*Calycadenia oppositifolia*) is a slender annual herb in the sunflower family (Asteraceae) (Figure 5.1.6-1). This species has no federal or State listing status, but is considered by CNPS to be rare, threatened, or endangered throughout its range (List 1B). This species is restricted to a 32 mile band along the Sierra Nevada and Cascade Range foothills and lower coniferous forest from northeast of Chico to southeast of Oroville. The elevation range is 295 ft (90m) to 3100 ft (945 m). Butte County calycadenia grows in openings in blue oak woodlands, chaparral, mixed oak woodlands, and pine/mixed oak woodlands. Soils are usually shallow and are often derived from serpentine but include volcanic and granitic parent material.



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Figure 5.1.6-1. Butte County calycadenia and habitat.

The CSUC Herbarium records two locations from within the project area and another eight nearby. Surveys during 2002/2003 located Butte County calycadenia in nine general areas within the study area: Loafer Creek Recreation Area, Kelly Ridge Recreation Area, Thermalito Diversion Pool, Potter Ravine Recreation Area, Foreman Creek Recreation Area, Bloomer Hill Primitive Recreation Area, Rich Gulch (near the mouth of West Branch), West Branch, and North Fork. Other than one small occurrence within the Lime Saddle Recreation Area, about half of the occurrences around the West Branch are on BLM lands within the Project area. The Rich Gulch occurrences are all on BLM lands. Around the North Fork, about half of the occurrences are on National Forest lands. The vast majority of plants seen are in the West Branch, Rich Gulch, and North Fork areas; the North Fork especially contains a number of large openings with “carpets” composed of hundreds of thousands of plants. These areas of greatest abundance are mostly on or close to shallow serpentine-derived soils; the soils of the other areas are generally of volcanic origin. Butte County calycadenia was always found in small to large grassy openings within woodland, chaparral, and forest environments, most abundantly on southerly-facing slopes. Potential impacts include construction and maintenance of roads, trails, and other facilities.

Brandeggee’s clarkia (*Clarkia biloba* ssp. *brandegeae*) is an annual herb in the evening primrose family (Onagraceae) (Figure 5.1.6-2). This species has no federal or State listing status, but is considered by CNPS to be rare, threatened, or endangered throughout its range (List 1B). It occurs in the Sierra Nevada foothills from Butte, Yuba, Nevada, Placer, and El Dorado counties (CNPS 2001). It ranges in elevation from 968 ft (295m) to 2903 ft (885m). Brandeggee’s clarkia grows in openings and roadcuts in blue oak woodlands, chaparral, mixed oak woodlands, and pine/mixed oak woodlands. It is threatened by road maintenance and fire suppression.



Figure 5.1.6-2. Brandegee's clarkia and habitat.

This species was known to occur within and adjacent to the Project area. Surveys by DWR personnel in 2002 and 2003 located Brandegee's clarkia in seven general areas: Thermalito Diversion Pool, Bidwell Bar Bridge, Stringtown Mountain, Enterprise Bridge, Craig Recreation Area, Sycamore Creek Recreation Area, and Middle Fork. All of these areas, except recreation areas and the Diversion Pool, are on BLM lands within the Project area. The majority of plants were found along the Middle Fork, where small grassy openings in oak and pine-oak woodlands contain tens of thousands of plants.

Within recreation areas there is potential for impacts to Brandegee's clarkia from construction of roads, trails, and other facilities. In Craig Recreation Area and at the south end of the Bidwell Bar Bridge maintenance dirt roads already pass through occurrences and even basic road maintenance may impact some plants there. Old unused dirt roads in Sycamore Creek Recreation Area and in Middle Fork also pass through occurrences of Brandegee's clarkia.

White-stemmed clarkia (*Clarkia gracilis* ssp. *albicaulis*) is an annual herb in the evening primrose family (Onagraceae) (Figure 5.1.6-3). This species has no federal or State listing status. It is on the USFS Sensitive Plant list and is considered by CNPS to be rare, threatened, or endangered throughout its range (List 1B). It is threatened by urbanization. White-stemmed clarkia is known from only Butte and Tehama counties (CNPS 2001) from above Mill Creek in Tehama County in the north, to Bean Creek Road near Middle Fork Feather River in the southeast. The elevation range is 800 ft (244 m) to 3500 ft (1067m). White-stemmed clarkia grows in openings and roadcuts in chaparral, mixed oak woodlands, and pine/mixed oak woodlands.



Figure 5.1.6-3. White-stemmed clarkia and habitat.

Three of the known locations are within five miles from the Project area. Surveys in 2002 and 2003 located white-stemmed clarkia along the Middle Fork Feather River below Island Bar Hill and 0.8 miles south of the previously reported southern-most location, and along the North Fork below Swayne Hill. The occurrence in the Middle Fork is on BLM lands and half of the North Fork occurrences are on National Forest lands. Less than 200 plants were seen overall. White-stemmed clarkia was found in grassy openings within open woodland on northerly-facing slopes (Middle Fork) and in large openings along dirt road fill, cutbanks, and road edge on southerly-facing slopes (North Fork).

Along the North Fork, access roads have impacted occurrences of white-stemmed clarkia and some of these dirt roadways are still in occasional use. Road reconstruction or basic road maintenance could have some impact to this species.

Mosquin's clarkia (*Clarkia mosquinii*) is an annual herb in the evening primrose family (Onagraceae) (Figure 5.1.6-4). This species has no federal or State listing status. It is on the USFS Sensitive Plant list and is considered by CNPS to be rare, threatened, or endangered throughout its range (List 1B). Mosquin's clarkia is known only from Butte and Plumas counties (CNPS 2001) in a band of northwest to southeast trending Sierra Nevada foothills and coniferous forest 18 miles long and 14 miles wide. The elevation range is 980 ft (299m) to 4320 ft (1317m), although the extirpated occurrence at the site of the original Enterprise Bridge, now under the waters of Lake Oroville, could have been as low as 607 ft (185m) elevation. Mosquin's clarkia grows in openings and roadcuts in chaparral, mixed oak woodlands, pine/mixed oak woodlands, and lower mixed conifer forest, mostly on southerly-facing slopes.



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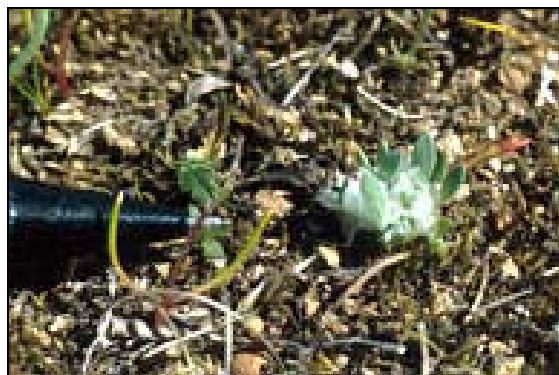
Figure 5.1.6-4. Mosquin's clarkia and habitat.

Two occurrences of Mosquin's clarkia were known within the Project area: one occurrence in Dark Canyon and an extirpated occurrence at the original Enterprise Bridge in the South Fork. Several occurrences were known adjacent to the Project area. Surveys in 2002 and 2003 located Mosquin's clarkia in four general areas: three scattered along the Middle Fork and one on the lower South Fork. All of the occurrences are on BLM and USFS lands. Mosquin's clarkia was most abundant on the west side of the lake where wildfire had recently burned. Mosquin's clarkia was mostly found in small grassy openings in mixed oak and pine/mixed oak woodlands, and on southerly-facing slopes.

Except for recent wildfire, there were no signs of disturbance present among these occurrences of Mosquin's clarkia. These sites are rather remote and steep, so the potential for future impacts seems low.

Ahart's paronychia (*Paronychia ahartii*) is an annual herb in the pink family (Caryophyllaceae) (Figure 5.1.6-5). It is recognized by the USFWS as a Species of Concern and by CNPS as a List 1B species, "Plants rare, threatened, or endangered in California and elsewhere" (CNPS 2001). It is threatened by habitat loss, and possibly by grazing and trampling. Ahart's paronychia is known from Butte, Shasta, and Tehama counties, from southern Shasta County to near Honcut in southern Butte County. The highest concentrations are in the northern part of the range of Ahart's paronychia within the lower foothills of the Cascade Ranges. The southern parts of the range are in the upper Sacramento Valley, with two occurrences at the edge of the foothills of the Sierra Nevada and Cascade Ranges. It ranges in elevation from 177 ft (54 m) to 1750 ft (533

m). It is found in valley and foothill grasslands and vernal pools, and in grasslands within foothill woodlands.



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Figure 5.1.6-5. Ahart's paronychia.

Ahart's paronychia was not known from within the Project area. The nearest locations were 6 miles to the southeast and 14 miles to the northwest of the Project area. Surveys in 2002 and 2003 located Ahart's paronychia at one site within the Project area: near the southern end of the Thermalito Forebay. About 1000 plants were seen at one small occurrence in a vernal pool complex within annual grasslands. This occurrence is adjacent to a public road and an abandoned railroad grade. The hydrology of the site may have been affected by the construction of those facilities. The general area is used for many recreational activities. Potential impacts to Ahart's paronychia exist from construction of roads, trails, and other facilities, as well as from off-road vehicle activities.

Sanford's arrowhead (*Sagittaria sanfordii*) is a perennial herb in the water-plantain family (Alismataceae) (Figure 5.1.6-6). It is recognized by the USFWS as a Species of Concern and by CNPS as a List 1B species, "Plants rare, threatened, or endangered in California and elsewhere" (CNPS 2001). Sanford's arrowhead is known from Del Norte, Shasta, Tehama, Butte, Sacramento, San Joaquin, Fresno, Merced, Kern, Ventura, and Orange counties, although it is reported as extirpated from Ventura and Orange counties (CNPS 2001). This distribution covers most of the length of California, a distance of 650 miles. The greatest concentration of occurrences is in Sacramento County. North of Sacramento County, Sanford's arrowhead is only known from four occurrences in Butte County, three in Tehama County and one in Del Norte County. The elevation range is 0 ft (0 m) to 2000 ft (610 m). Sanford's arrowhead is found in marshes and swamps, including the edges of shallow ponds and is threatened by grazing, development, and channel alteration.



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Figure 5.1.6-6. Sanford's arrowhead.

Sanford's arrowhead was not known from within the Project area. The 3 known Butte County locations of Sanford's arrowhead are 2 miles to the southeast of the North Fork Feather River arm of the Project area, 6 miles southwest of the OWA, and 25 miles to the northwest of the project area. Surveys in 2002 and 2003 located Sanford's arrowhead at one site around a brood pond of the Thermalito Afterbay. While this wetland habitat is maintained by the fairly constant water levels, manipulation or long-drawdown of water levels could potentially impact this species. Within the Afterbay, Sanford's arrowhead occurs near but not intermixed with the invasive purple loosestrife. Any management treatment of purple loosestrife could potentially impact this species.

Cut-leaved ragwort (*Senecio eurycephalus* var. *lewisrosei*) is a perennial herb in the sunflower family (Asteraceae) (Figure 5.1.6-7). It is on the USFS Sensitive Plant list and is considered by CNPS to be rare, threatened, or endangered throughout its range (List 1B). Cut-leaved ragwort is known only from Butte and Plumas counties (CNPS 2001). It is threatened by mining and road maintenance. The distribution of cut-leaved ragwort is composed of 2 major areas in the northern-most Sierra Nevada about 21 miles apart. The area closest to the project area is 16 miles long from Magalia in the northwest to the vicinity of Bloomer Hill in the southeast and 11 miles wide. The other area, 21 miles to the northeast, is 9 miles long and 2 miles wide, generally centered near Red Hill and North Fork Feather River. The elevation range is 940 ft (287 m) to 4960 ft (1512 m). Cut-leaved ragwort is only found on serpentine soils and outcrops, in chaparral, foothill woodlands, and lower coniferous forests.



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Figure 5.1.6-7. Cut-leaved ragwort and habitat.

There was one known occurrence of this species within the Project area along the West Branch of the Feather River. Several occurrences were known within one to three miles of the Project area. Surveys in 2002 and 2003 located a number of occurrences within the West Branch, including the previously known site. About half of these occurrences are on BLM lands. Overall, several hundred plants were seen. All occurrences are on serpentine, in large and small grassy openings in foothill pine/mixed oak-chaparral, on mostly southerly-facing slopes. There is the potential for impacts to cut-leaved ragwort from mining and associated road building. Many of these areas have been impacted in the past by mining operations and access roads, and although these areas are not currently in use, erosion continues to be a problem. Most of these areas are somewhat accessible from the expanding neighborhoods of southeastern Paradise. All Terrain Vehicle (ATV) use was observed within the project area adjacent to the southern-most occurrence. This accessibility could also result in future impacts from recreational development and use.

Fox sedge (*Carex vulpinoidea*) is a perennial herb in the sedge family (Cyperaceae) (Figure 5.1.6-8). This species has no State or federal listing status. It is a CNPS List 2 species "Plants rare, threatened, or endangered in California, but more common elsewhere". It is reported from all states except Utah and Nevada (NRCS 2003). In California, fox sedge is reported from few widely scattered occurrences in Siskiyou, Trinity, Shasta, Tehama, and Butte counties (CNPS 2001). In Butte County it is known from three locations near the Sacramento River and one in the OWA. It ranges in elevation from 22 ft (7 m) to 2400 ft (732 m). Fox sedge grows on soggy ground along streams, ditches, ponds, and reservoirs.



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Figure 5.1.6-8. Fox sedge and habitat.

Surveys by DWR personnel in 2002 and 2003 located approximately 800 plants of fox sedge along the edge of the Thermalito Diversion Pool. A small portion of this occurrence is on BLM lands. In 1990, fox sedge was found on wet sandy soil bordering a pond in the OWA. This plant was not relocated during these surveys.

Fox sedge was probably not present in the area of the Thermalito Diversion Pool prior to creation of the Diversion Pool. The fairly constant water level provides habitat for this species and any changes in the management of the Pool level could negatively impact the fox sedge. The OWA is subject to heavy recreational use, picnicking, fishing, off-roading, and a changing network of dirt roads that may have contributed to the extirpation of the fox sedge there.

Four-angled spikerush (*Eleocharis quadrangulata*) is a perennial herb in the sedge family (Cyperaceae) (Figure 5.1.6-9). This is a CNPS List 2 species, “Plants rare, threatened, or endangered in California, but more common elsewhere” (CNPS 2001). It is known in California from Shasta, Tehama, Butte, and Merced counties (CNPS 2001; CNDDB Oct. 2003). The elevation range is 77 ft (23 m) to 612 ft (187 m). Four-angled spikerush grows in the shallow edges of freshwater marshes, swamps, and ponds.



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Figure 5.1.6-9. Four-angled spikerush and habitat.

Four-angled spikerush was known from within the Project area at One-Mile Pond near the southern end of the OWA. Surveys in 2002 and 2003 located this species at numerous sites within the Project area including the Thermalito Forebay, Thermalito Afterbay, around a series of small ponds near the Afterbay outlet, and around One-Mile Pond. Four-angled spikerush is densest around One-Mile Pond and in a number of the brood ponds of the Afterbay. It is mostly a component of the mixed emergent and rush vegetation types of the wetland plant community. While this wetland habitat is maintained by the fairly constant water levels, manipulation or long-drawdown of water levels could potentially impact this species. Within the Afterbay, four-angled spikerush occurs near but not usually intermixed with the invasive purple loosestrife. Any management treatment of purple loosestrife could potentially impact the four-angled spikerush.

Columbian watermeal (*Wolffia brasiliensis*) is a perennial aquatic herb in the duckweed family (Lemnaceae) (Figure 5.1.6-10). This is a CNPS List 2 species, "Plants rare, threatened, or endangered in California, but more common elsewhere" (CNPS 2001). In California Columbian watermeal is known from only 5 widely scattered occurrences in Butte, Glenn, and Yuba counties, from Chico Landing along the Sacramento River in Butte County southeast to Camp Far West Reservoir in the Sierra Nevada foothills of Yuba County. In Butte County Columbian watermeal is known from Chico Landing, Llano Seco, and Graylodge Wildlife Area. The elevation range is 60 ft (20 m) to 350 ft (105 m). Columbian watermeal grows floating on the surface of shallow freshwater sloughs and ponds. It also occurs in most states in the eastern half of the United States, plus Oregon, Washington, Utah, and Montana (NRCS 2003).



Figure 5.1.6-10. Columbian watermeal.

Columbian watermeal was not known from within the Project area. Surveys in 2002 and 2003 found Columbian watermeal floating in six old dredger ponds in two areas of the OWA: in two ponds just south of Hwy 162 and in four ponds on the east side of the Feather River opposite the Thermalito Afterbay outlet. About 0.8 acres of pond surface was mapped containing Columbian watermeal.

Columbian watermeal was probably not present in the area of the OWA before the creation of the dredger ponds and tailing piles, although it may have been present in natural sloughs and oxbows associated with the Feather River preceding the disturbance. The sites in the OWA are subject to heavy recreational use, picnicking, fishing, off-roading, and a shifting network of dirt roads. Management practices often clear vegetation from some of the ponds in the Wildlife Area.

Dissected-leaved toothwort (*Cardamine pachystigma* var. *dissectifolia*) is a perennial herb in the mustard family (Brassicaceae). This species has no federal or State listing status, but is a CNPS List 3 species (plants about which we need more information). It occurs in the coastal mountains of Mendocino, Sonoma, and Glenn counties and the mid elevations of the Sierra Nevada Mountains from Tehama to Placer counties. The elevation range is 660 ft (200 m) to 6900 ft (2100 m). The major concentration of this plant appears to be in Butte County where it grows in partial shade of Ponderosa pine and mixed conifer forest and associated chaparral.

Although there were no known occurrences within the Project area, three locations from CSUC Herbarium label data were within one-half to two miles from the Project boundary. During surveys in 2002 and 2003 this species was found at one small area on USFS land along the North Fork, upstream of the mouth of French Creek. About 150 plants were seen on a shady, steep, northeast-facing slope in Ponderosa pine-mixed oak woodland with Douglas-fir. One small, overgrown, mine adit was seen here; otherwise this area is not subject to current disturbances. This site is the location of the

first record of the non-native Ozark witchhazel (*Hamamelis vernalis*) in California. This well-established population of witchhazel dominates an area about 100 feet across slope by 200 feet up and down slope, and borders the southeastern edge of the occurrence of dissected-leaved toothwort.

These plants found along the North Fork Feather River arm of Lake Oroville correspond to an undescribed taxon ("*Cardamine* sp. #3") that occurs "from the Sacramento River drainage to Nevada County" (Clifton, 2003). According to Clifton (2003), "true" *Cardamine pachystigma* var. *dissectifolia* is restricted to serpentine soils in Butte and Plumas counties (Clifton treats this at the species level, as *Cardamine dissectifolia*, an as yet unpublished combination). *Cardamine pachystigma* var. *pachystigma* was also present at this site although it was found more on the cooler more north-facing slopes (Clifton treats this at the species level, as *Cardamine pachystigma*).

Butte County fritillary (*Fritillaria eastwoodiae*) is a perennial herb in the lily family (Liliaceae). It is a CNPS List 3, "Plants about which we need more information – a review list" (CNPS 2001). It is threatened on private lands by logging and development. Butte County fritillary is known from Shasta, Tehama, Butte, Yuba, Nevada, and Placer counties (CNPS 2001). It occurs along a northwest to southeast trending band of Sierra Nevada and Cascade Range foothills and lower coniferous forest 130 miles long and up to 19 miles wide. Sixty percent of the occurrences reported in CNDDB are in Butte County. Plants from Shasta and Tehama counties may be a separate, undescribed, species or subspecies (CNPS 2001). It ranges in elevation from 164 ft (50 m) to 4921 ft (1500 m). It grows in partial shade in chaparral and foothill woodlands and in openings in the lower coniferous forest.

No occurrences of Butte County fritillary were known from within the Project area, although several occurrences are adjacent near the West Branch, upper North, Middle, and South Forks. Surveys by DWR personnel in 2002 and 2003 found identifiable Butte County fritillary (i.e., with flowers) at several sites along North Fork between French Creek and the mouth of West Branch, along South Fork near the Stringtown Road boat ramp, and along the access road to Craig Boat-in Campground. Numerous occurrences of un-identifiable Butte County fritillary (i.e., no flowers present) were also found within the project area. These occurrences of non-flowering fritillary are tentatively presented here as Butte County fritillary since all flowering plants of fritillary found during these surveys in the project area were Butte County fritillary. These many additional occurrences are along West Branch (including next to the Lime Saddle Campground), North Fork, Middle Fork, South Fork, along the main stem (along the access roads to Bloomer Boat-in Group Campground and Goat Ranch Boat-in Campground), and near the Oroville Dam powerhouse intake. Butte County fritillary was mostly found on northerly facing slopes, mostly within the mixed conifer-hardwood forest, Ponderosa pine-mixed oak woodland, mixed oak woodland, and foothill pine-mixed oak woodland/chaparral plant communities. These areas usually had some

degree of filtered sunlight, and although fritillary was sometimes also found in deep shade the plants there tended to only produce basal leaves.

Within recreation areas there is potential for impacts to Butte County fritillary from construction of roads, trails, and other facilities. In several recreation areas, dirt roads already pass through occurrences and even basic road maintenance could impact the plants there. Butte County fritillary prefers to have some degree of filtered sunlight; it doesn't do as well in dense shade although it may persist in a vegetative state for a number of years. Thus, fire suppression may be detrimental to Butte County fritillary due to the resulting decrease in sunlight reaching the forest and woodland floor as the tree and shrub canopies close.

5.1.7 CNPS List 4 – Located Within Study Area

Humboldt Lily (*Lilium Humboldtii* ssp. *Humboldtii*) is a perennial herb in the lily family (Liliaceae). This CNPS List 4 species is also on the Plumas National Forest Special Interest list. It is known from along the western Sierra Nevada foothills from Tehama County in the north to Fresno County in the south at elevations from 100 ft (30 m) to 6000 ft (1800 m) (CNPS 2001). Within Butte County, it is usually found in coniferous forest away from drainages (Oswald 1994). Humboldt lily is threatened by development and horticultural collecting.

During 2003 surveys, approximately 65 plants were found on north-facing slopes in dense mixed conifer hardwood forest, foothill pine-mixed hardwood forest, and Ponderosa pine-mixed oak woodland at elevations. A single plant found near a service road above the Diversion Pool on BLM land could be impacted due to road maintenance or recreational use. No impacts are expected to the remainder of Humboldt lilies found around Lake Oroville. All are located on steep slopes away from facilities.

Sylvan microseris (*Microseris sylvatica*) is a perennial herb in the sunflower family (Asteraceae). It is known from over 20 counties in California from Los Angeles to Tehama at elevations of 150 ft (45 m) to 5000 ft (1500 m) (CNPS 2001). Within Butte County, it is rare to locally common in oak woodlands, chaparral and grasslands (Oswald 1994). It is threatened by grazing and agriculture.

During 2003 surveys, approximately 240 plants were found in 2 locations, 1 in foothill pine-mixed oak woodland and the other in a grassy opening. Both occurrences are located away from existing facilities. No project impacts are expected to this species.

Shield-bracted monkeyflower (*Mimulus glaucescens*) is an annual herb in the figwort family (Scrophulariaceae). This CNPS list 4 species is also on the Plumas National Forest Special Interest list. It is known from Butte, Colusa, Lake, Nevada, Shasta, and Tehama counties at elevations from 200 ft (60 m) to 4100 ft (1240 m) (CNPS 2001). In

Butte County it is locally common in moist areas in the foothills and lower coniferous forests (Oswald 1994).

During 2002 and 2003 surveys, several thousand plants were found in the project area in 18 separate occurrences within oak, oak/pine woodlands, mixed conifer, and mixed chaparral habitats. Shield-bracted monkeyflower was located in and along drainages; two occurrences were below the high water line, and on two occasions on steep, rocky, moist northwest-facing slopes. Most occurrences were on USFS, BLM land, or within the Foreman Creek Recreation Area. Impacts to this species within the Foreman Creek Recreation Area could occur from recreational use and/or maintenance activities.

Small-flowered monkeyflower (*Mimulus inconspicuus*) is an annual herb in the figwort family (Scrophulariaceae). This species was known from Amador, Calaveras, Mariposa, and Tuolumne counties at elevations from 1800 ft (550 m) to 2500 ft (760 m). It was reported in Butte County from a single site near Pulga (Oswald 1994). It occurs in mesic sites in partial shade of coniferous forests (CNPS 2001).

During 2003 surveys, 18 plants were found in two general areas in the West Branch and North Fork areas. Both are along drainages of steep slopes. No project impacts are expected to this species.

Sickle-fruit jewel flower (*Streptanthus drepanoides*) is an annual herb in the mustard family (Brassicaceae). This species is known from Butte, Glenn, Lake, Mendocino, Shasta, Tehama, and Trinity counties. It occurs on serpentine soils in open chaparral or oak/ pine woodlands at elevations from 900 ft (275 m) to 5500 ft (1600 m) (CNPS 2001).

During 2002 and 2003 surveys, approximately 200 plants were found on serpentine soils within blue oak woodland/chaparral. Maintenance activities could impact this species.

5.1.8 Plant Species Identified in Study Area

A total of 674 plant species were identified in the project area during the 2002/2003 surveys (Appendix E). Four hundred and eighty-five (72%) of these are native species and 187 are considered non-native to California.

5.1.9 Federal Lands

Both federal land management agencies that hold lands within the project area (USFS and BLM) have an obligation to insure that project operations do not adversely affect sensitive resources.

5.1.9.1 North Fork

Of the approximately 1390 acres in the North Fork arm of the lake, about 590 acres are federal lands (USFS 577 acres: BLM 13 acres). The vegetation on the USFS land is dominated by mixed conifer-hardwood forest, mixed pine-mixed oak woodland-chaparral, and Ponderosa pine-mixed oak woodland, with lesser amounts of Douglas fir forest, mixed oak woodland, and Ponderosa pine-Douglas forest. The BLM land is dominated by blue oak-foothill pine woodland. Small areas of California annual grassland and riparian habitat are present. Serpentine occurs in the northern part of the area. Open serpentine is habitat for the federally and State listed Layne's ragwort, as well as for several special status plant species, particularly Jepson's onion and cut-leaved ragwort. The various forest, woodland, and grassland habitats have potential for a number of special status plant species, particularly Butte County calycadenia, Brandegee's clarkia, white-stemmed clarkia, Mildred's clarkia, Mosquin's clarkia, Butte County fritillary, Butte County checkerbloom, and dissected-leaved toothwort. The riparian habitat may support fox sedge.

Approximately 220 acres of USFS land was surveyed in March, April, June, and July of 2003. All serpentine areas were surveyed completely for Layne's ragwort except for areas that were inaccessible due to steepness of terrain or thickness of vegetation. The majority of the inaccessible terrain and areas of thick vegetation are not suitable habitat for any of the special status species. However, pockets of suitable habitat may occur within these areas. Four special status plant species were found on federal lands: Butte County calycadenia, dissected-leaved toothwort, white-stemmed clarkia, and Butte County fritillary. **Butte County calycadenia** was found in numerous areas upstream of French Creek, on moderately- to very-steep southerly-facing slopes in large and small grassland openings in Ponderosa pine-mixed oak woodlands. These areas include both serpentine soils and adjacent non-serpentine soils. It is estimated that more than a million of these annual plants were seen, probably several million, often dominating parts of the openings where they were found. About half of them are on USFS land. Some of the openings, especially on serpentine, have been impacted in the past by mining, including abandoned narrow access roads and water ditches. The lower edge of these slopes, often just above lake level, is crossed by an extensive abandoned railroad cut that is now an occasionally used dirt road. Butte County calycadenia occasionally grows in these disturbed areas, but by far the greatest concentrations are in the undisturbed openings. **Dissected-leaved toothwort** was found in one area upstream of French Creek, on a shady, steep, northeast-facing slope in Ponderosa pine-mixed oak woodland with Douglas-fir. Only about 150 plants were seen, all on USFS land. One small, overgrown, mine adit was seen here; otherwise this area is not subject to current disturbances although some logging has also occurred in the past. These plants correspond to an undescribed taxon ("*Cardamine* sp. #3") that occurs "from the Sacramento River drainage to Nevada County" (Clifton 2003). According to Clifton "true" *Cardamine pachystigma* var. *dissectifolia* is restricted to serpentine soils in Butte and Plumas counties (Clifton treats this at the species level, as

Cardamine dissectifolia, an as yet unpublished combination). White-stemmed clarkia was found in several small areas upstream of French Creek on southerly-facing slopes along the old railroad opening, in the annual grassland growing on the cutbanks and fill slopes in the opening through Ponderosa pine-mixed oak woodlands. These areas include both serpentine soils and adjacent non-serpentine soils. Approximately 200 plants were seen with half on USFS land. **Butte County fritillary** was found scattered in most of the lands surveyed downstream of French Creek, on moderately-steep north-facing slopes dominated by mixed conifer hardwood forest and occasionally mixed oak woodland. About 328 plants were seen here, all on USFS land. These areas are not subject to current disturbances although some logging and mining has occurred in the past. Undercutting of the slope when the lake is full could result in occasional loss of plants.

Several CNPS List 4 special status plant species were also found on federal lands: stout-beaked toothwort (Plumas toothwort), Humboldt lily, shield-bracted monkeyflower, and small-flowered monkeyflower. **Stout-beaked toothwort** was found at numerous places throughout the surveyed areas, mostly on steep- to moderately-steep northerly-facing slopes, but also occasionally along cool, shady drainages on the southerly-facing slopes in mixed conifer-hardwood and Douglas fir forest. Plants were occasionally found in Ponderosa pine-mixed oak woodland, mixed pine-mixed oak woodland, and mixed oak woodland. Overall, tens of thousands of plants were seen, almost all on USFS lands. Although usually less than 100 plants were seen at any particular site, one area, along French Creek, with the coolest and moistest north-facing slope was the location of tens of thousands of plants. In general these areas were free of obvious disturbances except some old stumps as signs of past logging. **Humboldt lily** was found at three small areas downstream of Berry Creek, on north-facing slopes in mixed conifer-hardwood forest. Only about 50 plants were seen, all on USFS land. In general these areas were free of obvious disturbances except some old stumps as signs of past logging. **Shield-bracted monkeyflower** was found at two sites between French Creek and Berry Creek, along rocky creek beds in deep, shaded drainages on northwest-facing slopes of mixed oak woodland. Only a few plants were seen at each site, all on USFS land. No disturbance was noted at these locations. **Small-flowered monkeyflower** was found at three small sites between French Creek and Berry Creek, on moderately shady northerly- to southerly-facing slopes in mixed oak woodlands. Only about 20-30 plants were seen on USFS land. These areas are not subject to current disturbances although some logging has occurred in the past. Undercutting of the slope when the lake is full could result in some loss of plants.

5.1.9.2 Middle Fork

Of the approximately 2030 acres of the Middle Fork arm of the lake, about 830 acres are federal lands (USFS 320 acres: BLM 510 acres). The vegetation on the USFS land is dominated by canyon live oak woodland and mixed oak woodland, with lesser amounts of Ponderosa pine-mixed oak woodland-chaparral, mixed oak woodland-

chaparral, and Ponderosa pine-mixed oak woodland. A small amount of riparian habitat is also present. The BLM land is dominated by canyon live oak woodland and Ponderosa pine-mixed oak woodland, with lesser amounts of mixed oak woodland-chaparral, mixed oak woodland, foothill pine-mixed oak woodland-chaparral, mixed pine-mixed oak woodland, mixed conifer-hardwood forest and blue oak woodland. Small areas of California annual grassland, riparian habitat, and seeps are present. The various forest, woodland, and grassland habitats have potential for a number of special status plant species, particularly Butte County calycadenia, Brandegees's clarkia, white-stemmed clarkia, Mildred's clarkia, Mosquin's clarkia, Butte County fritillary, Butte County checkerbloom, and dissected-leaved toothwort. The riparian and wetland habitats may support fox sedge and California beaked-rush.

About 250 acres were surveyed in this area from April through July 2003, including 60 acres of USFS and 80 acres of BLM lands. Inaccessible areas were not surveyed. Four special status plant species were found on federal lands: Brandegees's clarkia, white-stemmed clarkia, Mosquin's clarkia, and Butte County fritillary. **Brandegee's clarkia** was found in numerous areas downstream of Bean Creek, mostly on steep northerly-facing slopes in large and small grassy openings in Ponderosa pine-mixed oak woodlands, foothill pine-mixed oak woodlands, and mixed oak woodlands. More than 100,000 plants were seen, mostly on BLM lands. Most of these areas show no sign of disturbance other than fire; burned areas appeared to have as many plants as unburned areas. Undercutting of the slope when the lake is full could result in occasional loss of plants. **White-stemmed clarkia** was found at one spot across from the mouth of Bean Creek, in a steep north-facing grassy opening in Ponderosa pine-mixed oak woodland. About 100-200 plants were seen here on BLM land. No disturbances were noted at this site. **Mosquin's clarkia** was found mostly on southerly-facing slopes, in open Ponderosa pine-mixed oak woodlands and open mixed oak woodlands. About 10,000 plants were seen on USFS lands. Much of these areas had been moderately burned in 1999, clearing much of the underbrush and apparently stimulating grass and forb growth. Another 100 plants were found at scattered locations on BLM lands. Other than fire, no disturbances were noted in these areas. Fritillary plants, tentatively identified as **Butte County fritillary** (no flowers were found to confirm the identification, except for at the western-most site, which is not on federal lands), were found scattered in many of the lands surveyed, on moderately-steep northerly-facing slopes mostly of Ponderosa pine-mixed oak woodland and mixed oak woodland. About 220 plants were seen here, including 100 on BLM lands and 100 on USFS lands. No disturbances, other than occasional fire effects, were noted in the federal areas. **Stout-beaked toothwort** (Plumas toothwort), a CNPS List 4 species, was found at scattered sites in the vicinity of Bean Creek, on moderately-steep north-facing slopes mostly of Ponderosa pine-mixed oak woodland. Only 136 plants were seen, all on BLM land. In general these areas were free of obvious disturbances.

5.1.9.3 South Fork

Of the approximately 1750 acres along the South Fork of the lake, about 590 acres are federal lands (USFS 260 acres; BLM 330 acres). The vegetation on the USFS land is dominated by Ponderosa pine-mixed oak woodland, mixed oak woodland-chaparral, and mixed pine-mixed oak woodland-chaparral, with lesser amounts of mixed oak woodland and Ponderosa pine-mixed oak woodland-chaparral. A small amount of riparian habitat is also present. The BLM land is dominated by mixed pine-mixed oak woodland-chaparral, mixed oak woodland, and Ponderosa pine-mixed oak woodland, with lesser amounts of foothill pine-mixed oak woodland, mixed oak woodland-chaparral, and mixed pine-mixed oak woodland. Small areas of California annual grassland are present. The various forest, woodland, and grassland habitats have potential for a number of special status plant species, particularly Butte County calycadenia, Brandegee's clarkia, white-stemmed clarkia, Mildred's clarkia, Mosquin's clarkia, Butte County fritillary, Butte County checkerbloom, and dissected-leaved toothwort. The riparian habitat may support fox sedge. Mosquin's clarkia has previously been reported from Stringtown Road where it is now at the bottom of Lake Oroville, and from Ponderosa Dam just outside of the project area boundary (both non-federal land) and Brandegee's clarkia has previously been reported from Ponderosa Dam (non-federal land) (DFG 2003).

About 70 acres of federal lands were surveyed during March, April, and June of 2002 (USFS 30 acres; BLM 40 acres). Three special status plant species were found on federal lands: Brandegee's clarkia, Mosquin's clarkia, and Butte County fritillary. **Brandegee's clarkia** was found downstream from the Enterprise Bridge, mostly on steep northerly-facing slopes in large and small grassy openings in Ponderosa pine-mixed oak woodlands and mixed pine-mixed oak woodlands. Several thousand plants were seen, all of them are on BLM lands. It was especially abundant on the north slopes of Stringtown Mountain. Most of these areas show no signs of disturbance other than a 1999 wildfire; burned areas appeared to have as many plants as unburned areas. Undercutting of the slope when the lake is full could result in occasional loss of plants. **Mosquin's clarkia** was found in one spot on a westerly-facing slope, in open Ponderosa pine-mixed oak woodland. Only eight plants were seen at this site on BLM land on the north slope of Stringtown Mountain. This area was burned in a 1999 wildfire; other than fire, no disturbances were noted in this area. Fritillary plants, tentatively identified as **Butte County fritillary** (no flowers were found to confirm the identification, except for one site near the Stringtown Road boat-ramp, which is not on federal lands), were found at widely scattered locations, on moderately-steep northerly-facing slopes mostly of Ponderosa pine-mixed oak woodland and mixed oak woodland. About 200 plants were seen here, including only two on BLM lands and only five on Forest Service lands. No disturbances, other than occasional fire effects, were noted in the federal areas.

Two CNPS List 4 species were found on federal lands. **Stout-beaked toothwort** was found near Ponderosa Dam on USFS land, on moderately-steep north-facing slopes of Ponderosa pine-mixed oak woodland and mixed oak woodland. About 1500 plants

were seen, half of them on the USFS land. In general these areas were free of obvious disturbances. **Humboldt lily** was found in one area on the north slope of Stringtown Mountain, on a moderately-steep north facing slope in mixed oak woodland. Only five plants were seen at this site on BLM land. This area was burned in a 1999 wildfire; other than wildfire, no disturbances were noted in the area.

5.1.9.4 West Branch

Of the approximately 1710 acres along the West Branch of the lake, there are approximately 240 acres of BLM land. The vegetation on the BLM land is dominated by mixed oak woodland-chaparral and mixed oak woodland, with lesser amounts of foothill pine-mixed oak woodland and mixed chaparral. Small areas of California annual grassland and riparian habitat are present. Serpentine is located on and off of BLM lands, especially in the northern part of the area. Open serpentine is habitat for the federally and State listed Layne's ragwort, as well as for several special status plant species, particularly Jepson's onion and cut-leaved ragwort. The various forest, woodland, and grassland habitats have potential for a number of special status plant species, particularly Butte County calycadenia, Brandegees clarkia, white-stemmed clarkia, Mildred's clarkia, Mosquin's clarkia, Butte County fritillary, Butte County checkerbloom, and dissected-leaved toothwort. The riparian habitats may support fox sedge. Cut-leaved ragwort has previously been reported from BLM lands near Cape Horn (DFG 2003), Butte County calycadenia has previously been reported from two sites near the Nelson Bar boat-ramp (non-federal land) (CSUC Herbarium) and Mosquin's clarkia has previously been reported from along Dark Canyon Road (non-federal land) (DFG 2003).

Approximately 40 acres of BLM lands were surveyed during May through July of 2003. The serpentine areas were completely surveyed. Three special status plant species were found on federal lands: Butte County calycadenia, Butte County fritillary, and cut-leaved ragwort. **Butte County calycadenia** was found in a number of areas, on flat to moderately-steep mostly easterly- and southerly-facing slopes in large and small grassland openings in foothill pine-mixed oak woodlands and Ponderosa pine-mixed oak woodlands. These areas include both serpentine soils and adjacent non-serpentine soils. About 150,000 were seen, often dominating parts of the openings where they were found. About two thirds of them are on BLM land. Some of the openings, especially on serpentine, have been impacted in the past by mining, including abandoned narrow access roads and water ditches. It occasionally grows in these disturbed areas, but by far the greatest concentrations are in the undisturbed openings. Fritillary plants, tentatively identified as **Butte County fritillary** (no flowers were found to confirm the identification), were found scattered in a number of areas, mostly on moderately-steep northerly-facing slopes dominated by foothill pine-mixed oak woodlands. Of the 85 plants seen here, only 2 were on BLM land (on a southwest-facing slope on serpentine). This area is not subject to current disturbances although mining has occurred in the vicinity in the past. This area was burned in a 1999 wildfire.

Cut-leaved ragwort was found at a number of sites upstream of the Nelson Bar boat-ramp, on mostly steep southerly-facing slopes in large and small grassland and rocky area openings in foothill pine-mixed oak woodland and foothill pine-mixed oak-chaparral woodlands. These areas are mostly serpentine soils. About 450 plants were seen, about 180 of them on BLM lands. Some of these openings, especially on serpentine, have been impacted in the past by mining, including abandoned narrow access roads and water ditches. Cut-leaved ragwort occasionally grows in these disturbed areas, but most of the plants are in the undisturbed openings. **Shield-bracted monkeyflower**, a CNPS List 4 species, was found in the bottoms of five small moist drainages upstream of the Nelson Bar boat-ramp, mostly in open foothill pine-mixed oak woodland-chaparral. These areas are mostly serpentine soils. Four of the drainages are on BLM lands. No disturbances were noted in these drainages, although mining has often occurred in the vicinity.

5.1.9.5 Main Body of Lake Oroville

Of the approximately 4070 acres here around the main stem of Lake Oroville, about 240 acres are BLM lands. The vegetation on the BLM land is dominated by mixed pine-mixed oak woodland-chaparral, with lesser amounts of mixed pine-mixed oak woodland, mixed oak woodland, foothill pine-mixed oak woodland-chaparral, and blue oak-foothill pine woodland-chaparral. A small amount of seep/spring habitat is present. The various forest and woodland habitats have potential for a number of special status plant species, particularly Butte County calycadenia, Brandegee's clarkia, white-stemmed clarkia, Mildred's clarkia, Mosquin's clarkia, Butte County fritillary, Butte County checkerbloom, and dissected-leaved toothwort. The wetland habitat may support fox sedge and California beaked-rush. Brandegee's clarkia has previously been reported from the south end of Bidwell Bar Bridge on federal land and from along the Oroville-Quincy Highway between Bidwell Bar Bridge and Canyon Creek Bridge (non-federal land) (CSUC 2003).

Approximately 25 acres of BLM land were surveyed during June and July of 2002 and April through June of 2002. Two special status plant species were found on the BLM land during these surveys: Brandegee's clarkia and Butte County fritillary.

Brandegee's clarkia was found at the south end of the Bidwell Bar Bridge, on steep northerly-facing slopes in large and small grassy openings in Ponderosa pine-mixed oak woodland-chaparral. Approximately 300 plants were seen. Much of this area was disturbed by access roads for the construction of the bridge; plants were found both on the road cutbanks and in undisturbed grassy openings. Fritillary plants, tentatively identified as **Butte County fritillary** (no flowers were found to confirm the identification), were found at three widely scattered locations, on moderately-steep northerly-facing slopes mostly of foothill pine-mixed oak woodland-chaparral. About 50 plants were seen here, 40 of them on BLM lands along the access road to the Goat Ranch Boat-in Campground. Plants here are on or just above the cutbank of the dirt access road. **Shield-bracted monkeyflower**, a CNPS List 4 species, was found at the

bottom of a small drainage of a moderately-steep southerly-facing slope of foothill pine-mixed oak woodland-chaparral. Of the 100 plants seen, approximately 20 were on BLM land. These plants occur mostly just below the high water line of Lake Oroville.

5.1.9.6 Diversion Pool

Of the approximately 1280 acres around the Diversion Pool, about 7 acres are BLM lands. The vegetation is dominated by blue oak-foothill pine woodland. The various woodland habitats have potential for a number of special status plant species, particularly Butte County calycadenia, Brandegee's clarkia, white-stemmed clarkia, Mildred's clarkia, Mosquin's clarkia, Butte County fritillary, and Butte County checkerbloom.

Surveys were conducted during June of 2003. One special status plant species was found on the federal land. **Fox sedge** was found along most of the northern and eastern shores of the Diversion Pool, including all of the shoreline through the BLM parcel. Of the 800 plants were seen, about 45 were on the BLM land. These plants are all at the edge of the waterline of the Diversion Pool.

6.0 ANALYSES

6.1 EXISTING CONDITIONS/ENVIRONMENTAL SETTING

Seventy-four special status plant species were originally identified as potentially occurring in the study area (project area and downstream Feather River floodplain). Sixteen of these species plus an additional CNPS List 4 species were found within the project area during the 2002 and 2003 field studies.

Two species of concern, four-angled spikerush (*Eleocharis quadrangulata*) and Sanford's sagittaria (*Sagittaria sanfordii*) were found around the margins of the Thermalito Afterbay, especially within the brood ponds. Four-angled spikerush was also found bordering the Thermalito Forebay, small ponds in the OWA, and One-Mile Pond. Fox sedge (*Carex vulpinoidea*) was found bordering the Thermalito Diversion Pool. Columbian watermeal (*Wolffia brasiliensis*) was found floating on a number of ponds in the OWA. Thirteen species were found in upland habitats around the Diversion pool and/or upland habitats or mesic sites above the Oroville Dam.

No federally or State listed species were found within the project area, however, habitat exists for six federally and/or State listed plant species. Five of these species are associated with vernal pools or ephemeral drainages. Vernal pools and swale complexes are a common part of the valley grassland habitats around the Thermalito Forebay and Afterbay complex. These pools and pool complexes range in size from less than .1 acre to 5 acres in size. The majority of pools are fairly shallow, although a number of large deep pools are present. These deep vernal pools with clay beds are preferred habitat for the summer-flowering State and federally listed hairy Orcutt grass (*Orcuttia pilosa*), slender Orcutt grass (*Orcuttia tenuis*), and Green's tuctoria (*Tuctoria greenei*). The federally threatened, summer flowering Hoover's spurge (*Chamaesyce hooveri*) prefers deep pools with little plant cover in the bottom. A few pools in the project area are suitable habitat for this species. The federally and State listed Butte County meadowfoam (*Limnanthes floccosa* ssp. *californica*) is an early flowering species (March-April) that inhabits ephemeral drainages and depressions. Many of the ephemeral drainages and pools are suitable habitat for the Butte County meadowfoam.

The federally and State listed Layne's ragwort (*Senecio layneae*) occurs in open pine and oak woodlands on serpentine and gabbro soils. Serpentine occurs along the West Branch and North Fork arms of Lake Oroville. No gabbro soils were identified from the geology maps used to plan the field studies. Thus prior to the 2002 and 2003 field seasons, it was believed that no gabbro soils occurred in the Project area. Surveys for Layne's ragwort were conducted only on the serpentine areas along the North Fork and the West Branch of Lake Oroville. Early in 2004 it was brought to our attention that 1975 geology maps showed gabbroic intrusions south of the South Fork arm of the Lake. Upon examination, we discovered that this intrusion crossed within the project

area both east and west of Stringtown Mountain along the South Fork. This intrusion is the same as that on which the nearest location of Layne's ragwort occurs. This occurrence is approximately five air miles from the Project area. This habitat will be surveyed during the 2004 field season. Although Layne's ragwort was not found during the 2002/2003 surveys, suitable habitat exists within the Project area.

The federally and State listed Hartweg's golden sunburst (*Pseudobahia bahifolia*) was historically known in Yuba County from the lower Feather River floodplain. This type locality has been extirpated. The nearest known occurrence for this species is in the eastern San Joaquin Valley. Because the Yuba County occurrence was more than 42 km (26 mi) south of the project area, surveys for this species were not conducted within the project area. No plants were found downstream along the Feather River. There is little probability of finding this plant within the study area.

6.2 PROJECT RELATED EFFECTS

Potential impacts to special status plant species and their habitats from project related activities may occur from 1) changes in hydrology; 2) facility maintenance or development; 3) vegetation and/or wildlife habitat management; 4) noxious weed management; 5) road maintenance and development; and 6) recreational use or development and/or maintenance associated with recreation areas.

Changes in project operations related to changing water levels could have a beneficial or detrimental effect on special status species around the Thermalito Afterbay, Forebay, and Diversion Pool. Four-angled spikerush, Sanford's sagittaria, and fox sedge have most likely benefited from the consistent water levels within these systems. Long draw-down periods may adversely affect these species. The development of additional brood ponds will most likely increase suitable habitat for the four-angled spikerush and Sanford's sagittaria. Wildlife habitat management around the Thermalito Afterbay may adversely affect the four-angled spikerush and Sanford's sagittaria. Fertilizer use may encourage non-native invasive species which compete with the native species. It is not known how these species will react to controlled burns within the brood ponds. Weed management may also adversely affect these species. However, hand sprayers (versus broad-cast spray) can be used to decrease the impact to surrounding vegetation.

Changes in water levels within Lake Oroville and flows in the Feather River downstream of the Oroville Dam will have little impact to special status plant species in the project area.

Maintenance and development activities around project facilities, including recreational areas, could impact a number of special status plant species. These include the Lime Saddle Campground, Nelson Bar Cartop Boat Ramp, Goat Ranch Boat-In Campground,

Bloomer Boat-in Campgrounds, Foreman Creek Recreation Area, Potter Ravine Recreation Area, Stringtown Car-top Boat Ramp, Craig Saddle Boat-In Campground, Loafer Creek Recreation Area, Kelly Ridge Recreation Area, Thermalito Complex, and the OWA. Impacts include road and trail maintenance or development, weed management, increased recreational use, sediment runoff, and changes in hydrology.

Although no federal or State listed vernal pool species were found in the project area, habitat does exist and occurrences exist nearby. Impacts that could potentially affect vernal pool habitat exist from maintenance activities, sedimentation, soil disking or crop planting for wildlife management, off-road vehicle use, and herbicide use.

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APPENDICES

Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only

APPENDIX A
BOTANICAL SURVEY PERSONNEL

Botanical Survey Personnel – Years of experience /rare plant surveys

Gail Kuenster - Environmental Scientist/Botanist - 15 years experience

Lawrence Janeway - Environmental Scientist/Botanist - 15+ years experience

Beth Hendrickson - Environmental Scientist/Botanist - 15+ years experience

Harry Spanglet - Environmental Scientist/Botanist - 3 years experience

Shirley Innecken - Fish and Wildlife Scientific Aid - 2+ years experience

Gavin Blosser - Graduate Student Assistant/Botanist

John Hunt - Graduate Student Assistant/Botanist

Paul Kirk – Graduate Student Assistant/Botanist

Christine Hantelman - Graduate Student Assistant/Botanist

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APPENDIX B

SPECIAL STATUS PLANT SPECIES TOTAL SURVEY DAYS WITHIN PROJECT AREA 2002/2003

Date	Surveyor initials	Number of person survey days above dam	Number of person survey days below dam
06/30/02	bh,hs	2	
07/01/02	bh,hs	2	
08/07/02	gk		1
08/13/02	si		1
08/14/02	si		1
09/16/02	bh		1
09/17/02	si, bh		2
03/12/03	lj,gk,ah,gb	4	
03/18/03	lj,gb,ah	3	
03/19/03	lj,gb,si,jw	4	
03/20/03	lj,pk,gb,bh	4	
03/25/03	lj,gb,ah	3	
03/27/03	lj,gb,pk	3	
04/02/03	bh,ch,jh,gb		4
04/03/03	gk,bh		2
04/08/03	lj,gb,ah	3	
04/09/03	bh		1
04/10/03	lj,gb,ah	3	
04/10/03	bh		1
04/14/03	bh,jh,ch		3
04/15/03	lj,gb,jh,ah	4	
04/16/03	bh		1
04/17/03	bh		1
04/19/03	bh		1
04/21/03	bh,ch,jh		3
04/22/03	lj,jh,gb,ah	4	
04/23/03	lj,gb	2	
04/30/03	lj,gb,ah	3	
04/30/03	bh,ch,jh		3
05/01/03	lj,gb	2	
05/05/03	bh		1
05/06/03	lj,.gb,jh	3	
05/07/03	lj	1	
05/07/03	bh		1
05/12/03	bh		1
05/13/03	lj,jh,ah	3	
05/14/03	lj,gk,si	3	
05/14/03	bh,jh,ch		3
05/15/03	bh,ch,jh		3
05/19/03	bh,jh,ch		3
05/21/03	lj,jh	2	

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SP-T2, Project Effects On Special Status Plant Species, Draft Final Report
Oroville Facilities P-2100 Relicensing

Date	Surveyor initials	Number of person survey days above dam	Number of person survey days below dam
05/21/03	bh		1
05/22/03	lj,jh	2	
05/22/03	bh		1
05/27/03	lj,jh	2	
05/28/03	bh,ch		2
05/29/03	lj,jh,ah	3	
06/02/03	jh,ch		2
06/03/03	lj,jh,ah	3	
06/05/03	lj,jh	2	
06/05/03	bh		1
06/06/03	lj,jh	2	
06/09/03	bh,ch, jh		3
06/10/03	lj,jh,ah	3	
06/11/03	bh, ch		2
06/12/03	lj,jh	2	
06/12/03	bh		1
06/13/03	lj,jh	2	
06/17/03	lj,jh,ah	3	
06/19/03	lj,ch	2	
06/20/03	lj,jh	2	
06/23/03	jh,ch		2
06/27/03	lj,jh	2	
06/28/03	lj,jh,ch	3	
06/30/03	jh,ch	2	
07/01/03	lj,jh	2	
07/03/03	lj,ch	2	
07/07/03	jh,ch	2	
07/10/03	lj,ch	2	
07/11/03	lj,jh	2	
07/11/03	gk,ch		2
07/14/03	jh,ch		2
07/15/03	lj,jh	2	
07/15/03	gb		1
07/16/03	gb		1
07/17/03	lj,jh	2	
07/17/03	bh,ch		2
07/22/03	gb		1
07/23/03	gb		1
07/24/03	gb		1
07/29/03	gb		1
07/31/03	gb		1
08/01/03	gb		1
08/05/03	gb		1
08/06/03	gb		1
08/07/03	bh		1
08/12/03	gb		1
08/13/03	gb		1
08/18/03	bh		1
08/20/03	bh		1

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Date	Surveyor initials	Number of person survey days above dam	Number of person survey days below dam
08/21/03	bh,ch		2
08/27/03	bh,ch		2
09/03/03	bh,ch		2
09/17/03	bh		1
09/18/03	bh		1
10/01/03	bh,ch		2
10/02/03	bh,ch		2
10/08/03	bh		1

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APPENDIX C
SPECIAL STATUS PLANT SPECIES
CNPS LIST 1, 2, & 3
OCCURRENCE MAPS

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APPENDIX D
SPECIAL STATUS PLANT SPECIES
CNPS LIST 4
OCCURRENCE MAPS

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APPENDIX E

Plant species found within the Project Area during 2002/2003 special status plants species surveys, riparian/wetland studies, and noxious weed surveys

Special status plant species are printed in bold, non-italic typeface, e.g. **Calycadenia oppositifolia**. Other California native plant names are printed in bold, italicized font, e.g. ***Azolla filiculoides***. Non-native plant names are printed in italics, e.g. *Vinca major*.

FAMILY <i>Genus species</i>	Common Name	Origin	CNPS List	At lake	Below dam
FERNS AND FERN ALLIES					
AZOLLACEAE					
<i>Azolla filiculoides</i>	Large mosquito-fern	native			x
BLECHNACEAE					
<i>Woodwardia fimbriata</i>	Giant chain fern	native			x
DENNSTAEDTIACEAE					
<i>Pteridium aquilinum</i> var. <i>pubescens</i>	Bracken fern	native		x	
DRYOPTERIDACEAE					
<i>Dryopteris arguta</i>	Coastal wood fern	native		x	
<i>Polystichum</i> sp.	Sword fern	native		x	
<i>Polystichium imbricans</i> ssp. <i>imbricans</i>	Narrow-leaved sword fern	native		x	
<i>Polystichium munitum</i>	Western sword fern	native		x	
EQUISETACEAE					
<i>Equisetum arvense</i>	Common horsetail	native		x	x
<i>Equisetum hyemale</i> ssp. <i>affine</i>	Common scouring rush	native		x	
<i>Equisetum laevigatum</i>	Smooth scouring-rush	native			x
ISOETACEAE					
<i>Isoetes</i> sp.	Quillwort	native		x	
MARSILIACEAE					
<i>Marsilea vestita</i> ssp. <i>vestita</i>	Hairy pepperwort	native			x

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FAMILY Genus species	Common Name	Origin	CNPS List	At lake	Below dam
<i>Pilularia americana</i>	American pillwort	native			x
POLYPODIACEAE					
<i>Polypodium callirhiza</i>	Intermediate polypody	native		x	
PTERIDACEAE					
<i>Adiantum capillus-veneris</i>	Southern maidenhair	native		x	x
<i>Adiantum jordanii</i>	California maidenhair	native		x	
<i>Aspidotis densa</i>	Indian's dream	native		x	
<i>Pellaea mucronata</i> var. <i>mucronata</i>	Common bird'sfoot fern	native		x	
<i>Pentagramma triangularis</i> ssp. <i>triangularis</i>	Gold-backed fern	native			x
<i>Pentagramma triangularis</i> ssp. <i>Semipallida</i>	Silver-backed fern	native		x	
SELAGINELLACEAE					
<i>Selaginella</i> sp.	Spikemoss	native		x	

CONIFERS

CUPRESSACEAE					
<i>Calocedrus decurrens</i>	Incense-cedar	native		x	
<i>Cupressus arizonica</i>	Arizonia cypress	native			x
<i>Juniperus</i> sp.		non			x
PINACEAE					
<i>Pinus ponderosa</i>	Ponderosa pine	native		x	
<i>Pinus sabiniana</i>	Gray pine	native		x	x
<i>Pseudotsuga menziesii</i> var. <i>menziesii</i>	Douglas fir	native		x	
TAXACEAE					
<i>Torreya californica</i>	California nutmeg	native		x	

DICOTS

ACERACEAE					
<i>Acer macrophyllum</i>	Big-leaf maple	native		x	
ANACARDIACEAE					

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FAMILY Genus species	Common Name	Origin	CNPS List	At lake	Below dam
<i>Pistacia chinensis</i>	Ornamental pistachio	non			x
<i>Rhus ovata</i>	Sugar bush	native			x
<i>Rhus trilobata</i>	Skunkbrush	native		x	
<i>Schinus molle</i>	Peruvian pepper tree	non			x
<i>Toxicodendron diversilobum</i>	Western poison oak	native		x	x
APIACEAE					
<i>Anthriscus caucalis</i>	Bur-chervil	non		x	x
<i>Daucus pusillus</i>	Rattlesnakeweed	native			x
<i>Eryngium castrense</i>	Coyote-thistle	native		x	x
<i>Foeniculum vulgare</i>	Fennel	non		x	x
<i>Hydrocotyle umbellata</i>	Umbellate marsh-pennywort	native			x
<i>Lomatium dasycarpum ssp. tomentosum</i>	Woolly-fruited lomatium	native			x
<i>Lomatium marginatum var. marginatum</i>	Margined lomatium	native		x	
<i>Lomatium utriculatum</i>	Bladder lomatium	native			x
<i>Perideridia bolanderi ssp. involucrata</i>	Involucrate yampah	native		x	
<i>Perideridia kelloggii</i>	Kellogg's yampah	native		x	
<i>Perideridia lemmonii</i>	Lemmon's yampah	native		x	
<i>Sanicula bipinata</i>	Poison sanicle	native		x	x
<i>Sanicula bipinnatifida</i>	Purple sanicle	native		x	x
<i>Sanicula crassicaulis</i>	Pacific sanicle	native		x	
<i>Sanicula tuberosa</i>	Turkey pea	native		x	
<i>Scandix pecten-veneris</i>	Shepherd's needle	non			x
<i>Tauschia sp.</i>	Tauschia	native		x	
<i>Torilis arvensis ssp. arvensis</i>	Common hedge-parsley	non		x	x
<i>Torilis arvensis ssp. purpurea</i>	Purple hedge-parsely	non		x	
<i>Torilis nodosa</i>	Knotted hedge-parsley	non			x
APOCYNACEAE					
<i>Apocynum cannabinum</i>	Indian hemp	native			x
<i>Nerium oleander</i>	Oleander	non		x	
<i>Vinca major</i>	Periwinkle	non		x	
ARISTOLOCHIACEAE					
<i>Aristolochia californica</i>	California pipevine	native		x	x

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FAMILY Genus species	Common Name	Origin	CNPS List	At lake	Below dam
<i>Asarum hartwegii</i>	Hartweg's wild ginger	native		x	
ASCLEPIADACEAE					
<i>Asclepias cordifolia</i>	Purple milkweed	native		x	
<i>Asclepias fascicularis</i>	Narrow-leaved milkweed	native		x	x
ASTERACEAE					
<i>Achillea millifolium</i>	Yarrow	native		x	x
<i>Achyraea mollis</i>	Blowwives	native			x
<i>Agoseris grandiflora</i>	Large-flowered agoseris	native		x	x
<i>Agoseris retrorsa</i>	Spear-leaved agoseris	native		x	
<i>Ambrosia artemisiifolia</i>	Annual ragweed	non			x
<i>Anthemis cotula</i>	Mayweed	non		x	x
<i>Artemisia douglasiana</i>	Mugwort	native		x	x
<i>Aster chilensis ssp. chilensis</i>	California aster	native			x
<i>Aster oregonensis</i>	White-topped aster	native		x	
<i>Baccharis pilularis</i>	Coyote-bush	native		x	x
<i>Balsamorhzia deltoidea</i>	Deltoid balsamroot	native		x	x
<i>Bidens frondosa</i>	Beggarticks	native		x	x
<i>Blennosperma nanum var. nanum</i>	Yellow-carpet	native			x
<i>Brickellia californica</i>	California brickellbush	native		x	x
<i>Calycadenia multiglandulosa</i>	Sticky calycadenia	native		x	
<i>Calycadenia oppositifolia</i>	Butte County calycadenia	native	1B	x	x
<i>Calycadenia spicata</i>	Spiked calycadenia	native			x
<i>Calycadenia truncata</i>	Rosinweed	native		x	
<i>Carduus pycnocephalus</i>	Italian thistle	non		x	x
<i>Centaurea melitensis</i>	Tocalote	non		x	
<i>Centaurea solstitialis</i>	Yellow star-thistle	non		x	x
<i>Chaenactis glabriscula var. heterocarpha</i>	Yellow pincushion	native		x	
<i>Chamomilla suaveolens</i>	Common pineapple-weed	non		x	x
<i>Chondrilla juncea</i>	Skeleton weed	non		x	
<i>Cichorium intybus</i>	Chicory	non		x	x
<i>Cirsium occidentale var. venustum</i>	Venus thistle	native		x	x
<i>Cirsium vulgare</i>	Bull thistle	non		x	x
<i>Conyza canadensis</i>	Horseweed	native		x	x

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FAMILY Genus species	Common Name	Origin	CNPS List	At lake	Below dam
<i>Cotula coronopifolia</i>	Brassbuttons	non		x	x
<i>Eclipta prostrata</i>	False daisy	native			x
<i>Ericameria arborescens</i>	Goldenfleece	native		x	
<i>Erigeron inornatus</i> var. <i>inornatus</i>	California rayless daisy	native		x	
<i>Erigeron philadelphicus</i>	Philadelphia daisy	native		x	
<i>Eriophyllum lanatum</i> var. <i>grandiflorum</i>	Large-flowered wooly sunflower	native		x	x
<i>Filago californica</i>	California filago	native			x
<i>Filago gallica</i>	Narrow-leaved filago	non			x
<i>Gnaphalium canescens</i> ssp. <i>beneolens</i>	Fragrant cudweed	native			x
<i>Gnaphalium luteo-album</i>	Weedy cudweed	non		x	x
<i>Gnaphalium palustre</i>	Western marsh cudweed	native		x	
<i>Gnaphalium purpureum</i>	Purple cudweed	native			x
<i>Grindelia camporum</i> ssp. <i>camporum</i>	Valley gumplant	native			x
<i>Grindelia hirsutula</i> var. <i>davyi</i>	Foothill gumplant	native		x	
<i>Helenium puberulum</i>	Sneezeweed	native		x	x
<i>Helianthella californica</i> var. <i>nevadensis</i>	Sierra Nevada helianthella	native		x	
<i>Hemizonia fitchii</i>	Fitch's spikeweed	native		x	x
<i>Hemizonia pungens</i> ssp. <i>pungens</i>	Common spikeweed	native		x	x
<i>Hesperervax acaulis</i> var. <i>acaulis</i>	Dwarf evax	native			x
<i>Hesperervax acaulis</i> var. <i>robustior</i>	Robust evax	native		x	
<i>Heterotheca oregona</i> var. <i>compacta</i>	Goldenaster	native			x
<i>Hieracium albiflorum</i>	White-flowered hawkweed	native		x	
<i>Hieracium scouleri</i> var. <i>scouleri</i>	Scouler's hawkweed	native		x	
<i>Hypochaeris glabra</i>	Smooth cat's-ear	non		x	x
<i>Hypochaeris radicata</i>	Rough cat's ear	non		x	x
<i>Lactuca serriola</i>	Prickly lettuce	non		x	x
<i>Lagophylla glandulosa</i>	Glandular hareleaf	native		x	x
<i>Layia fremontii</i>	Fremont's tidytips	native			x
<i>Lasthenia californica</i>	California goldfields	native			x
<i>Lasthenia fremontii</i>	Fremont's goldfields	native			x
<i>Lasthenia glaberrima</i>	Smooth goldfields	native			x
<i>Lasthenia platycarpha</i>	Alkali goldfields	native			x
<i>Lessingia nana</i>	Dwarf lessingia	native			x

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<i>Lessingia nemaclada</i>	Slender-stemmed lessingia	native		x	
<i>Lessingia virgata</i>	Wand lessingia	native			x
<i>Madia elegans</i> ssp. <i>elegans</i>	Common madia	native		x	x
<i>Madia gracilis</i>	Slender tarweed	native		x	x
<i>Madia madioides</i>	Woodland madia	native		x	
<i>Malacothrix floccifera</i>	Woolly malacothrix	native		x	
<i>Micropus californicus</i> var. <i>californicus</i>	Slender cottonweed	native		x	x
<i>Microseris sylvatica</i>	Woodland microseris	native	4	x	
<i>Picris echinoides</i>	Bristly ox-tongue	non		x	x
<i>Psilocarphus brevissimus</i> var. <i>brevissimus</i>	Dwarf woolly-marbles	native			x
<i>Psilocarphus oregonus</i>	Oregon woolly-marbles	native			x
<i>Psilocarphus tenellus</i> var. <i>tenellus</i>	Slender woolly-marbles	native			x
<i>Senecio eurycephalus</i> var. <i>lewisrosei</i>	Lewis Rose's ragwort	native	1B	x	
<i>Senecio vulgaris</i>	Old-man-in-the-spring	non			x
<i>Silybum marianum</i>	Milk-thistle	non		x	x
<i>Solidago</i> sp.	Goldenrod	native		x	
<i>Sonchus asper</i>	Spiny-leaved sow-thistle	non		x	x
<i>Stephanomeria elata</i>	Santa Barbara stephanomeria	native		x	
<i>Taraxacum officinale</i>	Dandelion	non		x	x
<i>Tragopogon dubius</i>	Yellow salsify	non		x	x
<i>Uropappus lindleyi</i>	Silverpuffs	native		x	x
<i>Wyethia angustifolia</i>	Narrow-leaved mule's ears	native		x	
<i>Wyethia bolanderi</i>	Bolander's mule's ears	native		x	
<i>Xanthium spinosum</i>	Spiny cocklebur	native		x	x
<i>Xanthium strumarium</i>	Cocklebur	native		x	x
BERBERIDACEAE					
<i>Berberis aquifolium</i> var. <i>dictyota</i>	Jepson's barberry	native		x	
BETULACEAE					
<i>Alnus rhombifolia</i>	White alder	native			x
BORAGINACEAE					

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<i>Amsinckia lycopsoides</i>	Bugloss fiddleneck	native			x
<i>Amsinckia menziesii</i> var. <i>intermedia</i>	Common fiddleneck	native			x
<i>Amsinckia menziesii</i> var. <i>menziesii</i>	Menzies' fiddleneck	native			x
<i>Cryptantha flaccida</i>	Weak-stemmed cryptantha	native		x	
<i>Cryptantha intermedia</i>	Common cryptantha	native		x	
<i>Cynoglossum grande</i>	Pacific hound's tongue	native		x	
<i>Heliotropium curassavicum</i>	Wild heliotrope	native		x	
<i>Myosotis discolor</i>	Yellow scorpion-grass	non		x	
<i>Pectocarya penicillata</i>	Winged pectocarya	native		x	
<i>Plagiobothrys austinae</i>	Austin's popcorn flower	native			x
<i>Plagiobothrys bracteatus</i>	Bracted popcorn-flower	native		x	
<i>Plagiobothrys fulvus</i>	Fulvous popcorn-flower	native			x
<i>Plagiobothrys greenei</i>	Greene's popcorn-flower	native			x
<i>Plagiobothrys stipitatus</i> var. <i>micranthus</i>	Small-flowered stalked popcorn-flower	native			x
BRASSICACEAE					
<i>Arabis glabra</i> var. <i>glabra</i>	Tower-mustard	native		x	
<i>Athysanus pusillus</i>	Pretty athysanus	native		x	
<i>Cardamine oligosperma</i>	Western bittercress	native		x	x
<i>Cardamine pachystigma</i> var. <i>dissectifolia</i>	Dissected-leaved toothwort	native	3	x	
<i>Erysimum capitatum</i> ssp. <i>capitatum</i>	Western wallflower	native		x	
<i>Hirschfeldia incana</i>	Mediterranean hoary-mustard	non			x
<i>Lepidium nitidum</i> var. <i>nitidum</i>	Shining peppergrass	native			x
<i>Lepidium strictum</i>	Upright peppergrass	native			x
<i>Raphanus raphanistrum</i>	Jointed charlock	non			x
<i>Raphanus sativus</i>	Wild radish	non		x	x
<i>Rorippa nasturtium-aquaticum</i>	Watercress	native		x	x
<i>Streptanthus drepanoides</i>	Sickle-fruited jewelflower	native	4	x	
<i>Streptanthus polygaloides</i>	Milkwort jewelflower	native		x	
<i>Thysanocarpus radians</i>	Spokepod	native			x
CACTACEAE					
<i>Opuntia</i> sp.	Prickly pear cactus	non			x

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CALLITRICHACEAE					
<i>Callitriche marginata</i>	Winged water-starwort	native			x
CALYCATHANACEAE					
<i>Calycanthus occidentalis</i>	Western spicebush	native		x	
CAMPANULACEAE					
<i>Campanula prenanthoides</i>	California harebell	native		x	
<i>Downingia bella</i>	Hoover's downingia	native			x
<i>Downingia bicornuta</i> var. <i>bicornuta</i>	Double-horned downingia	native			x
<i>Downingia cuspidata</i>	Toothed downingia	native			x
<i>Downingia ornatissima</i> var. <i>ornatissima</i>	Ornate downingia	native			x
<i>Heterocodon rariflorum</i>	Heterocodon	native		x	
<i>Githopsis</i> sp.	Bluecup	native		x	
<i>Githopsis speculariodes</i>	Common bluecup	native			x
CAPRIFOLIACEAE					
<i>Lonicera hispidula</i> var. <i>vacillans</i>	Hairy honeysuckle	native		x	
<i>Lonicera interrupta</i>	Chaparral honeysuckle	native		x	x
<i>Sambucus mexicana</i>	Blue elderberry	native		x	x
<i>Symphoricarpos albus</i> var. <i>laevigatus</i>	Common snowberry	native		x	x
CARYOPHYLLACEAE					
<i>Cerastium glomeratum</i>	Sticky mouse-eared chickweed	non			x
<i>Lychnis coronaria</i>	Mullein-pink	non		x	
<i>Minuartia californica</i>	California sandwort	native			x
<i>Minuartia douglasii</i>	Douglas' sandwort	native		x	x
<i>Paronychia ahartii</i>	Ahart's nailwort	native	1B		x
<i>Petrorhagia dubia</i>	Grass pink	non		x	x
<i>Sagina apetala</i>	Dwarf pearlwort	native			x
<i>Saponaria officinalis</i>	Bouncing-bet	non			x
<i>Silene californica</i>	Indian pink	native		x	x
<i>Silene gallica</i>	Windmill pink	non			x
<i>Spergula arvensis</i> ssp. <i>arvensis</i>	Cornspurry	non		x	
<i>Spergularia bocconeii</i>	Boccone's sandspurry	non			x

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<i>Stellaria media</i>	Common chickweed	non			x
<i>Velezia rigida</i>	Velezia	non		x	x
CERATOPHYLLACEAE					
<i>Ceratophylla demersum</i>	Hornwort	native			x
CHENOPODIACEAE					
<i>Chenopodium album</i>	Lamb's-quarters	non			x
<i>Chenopodium ambrosioides</i> var. <i>ambrosioides</i>	Mexican tea	non			x
CONVOLVULACEAE					
<i>Calystegia occidentalis</i> var. <i>occidentalis</i>	Western morning glory	native		x	x
<i>Convolvulus arvensis</i>	Bindweed	non		x	
CORNACEAE					
<i>Cornus nuttallii</i>	Mountain dogwood	native		x	
<i>Cornus sessilis</i>	Black-fruited dogwood	native		x	
CRASSULACEAE					
<i>Crassula aquatica</i>	Water pygmyweed	native			x
<i>Crassula connata</i>	Pygmyweed	native			x
<i>Dudleya cymosa</i> ssp. <i>cymosa</i>	Canyon dudleya	native			x
<i>Parvisedum pumilum</i>	Dwarf-stonecrop	native		x	x
<i>Sedum spathulifolium</i>	Broad-leaved stonecrop	native		x	
CUCURBITACEAE					
<i>Marah watsonii</i>	Taw manroot	native		x	
CUSCUTACEAE					
<i>Cuscuta californica</i> var. <i>californica</i>	California dodder	native		x	
<i>Cuscuta howelliana</i>	Boggs Lake dodder	native			x
<i>Cuscuta indecora</i> var. <i>indecora</i>	Dodder	native			x
ERICACEAE					
<i>Arbutus menziesii</i>	Pacific madrone	native		x	
<i>Arctostaphylos manzanita</i> ssp. <i>manzanita</i>	Big manzanita	native		x	x

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<i>Arctostaphylos mewukka</i> ssp. <i>mewukka</i>	Indian manzanita	native		x	
<i>Arctostaphylos viscida</i>	White-leaved manzanita	native		x	
EUPHORBIACEAE					
<i>Chamaesyce maculata</i>	Spotted spurge	non			x
<i>Chamaesyce ocellata</i> ssp. <i>ocellata</i>	Valley spurge	native			x
<i>Chamaesyce serpyllifolia</i> ssp. <i>serpyllifolia</i>	Thyme-leaved spurge	native		x	x
<i>Eremocarpus setigerus</i>	Turkey mullein	native		x	x
<i>Sapium sebiferum</i>	Chinese tallow tree	non		x	
FABACEAE					
<i>Acaica baileyana</i>	Cootamundra wattle	non			x
<i>Acacia melanoxylon</i>	Blackwood acacia	non			x
<i>Albizia julibrissin</i>	Silktree	non			x
<i>Cercis occidentalis</i>	Western redbud	native		x	x
<i>Cytisus scoparius</i>	Scotch broom	non			x
<i>Genista monspessulana</i>	French-broom	non		x	x
<i>Gleditsia tricanthos</i>	Honey-locust	non			x
<i>Glycyrrhiza lepidota</i>	American licorice	native			x
<i>Hoita macrostachya</i>	Large leather-root	native		x	
<i>Lathyrus sulphureus</i>	Snub pea	native		x	
<i>Lathyrus tingitanus</i>	Tangier pea	non			x
<i>Lotus argophyllus</i> var. <i>fremontii</i>	Silver-leaved lotus	native		x	
<i>Lotus corniculatus</i>	Bird-foot trefoil	non		x	x
<i>Lotus purshianus</i> var. <i>purshianus</i>	Spanish lotus	native		x	x
<i>Lotus scoparius</i> var. <i>scoparius</i>	California broom	native			x
<i>Lotus strigosus</i>	Strigose lotus	native		x	
<i>Lupinus albicaulis</i>	Sickle-keeled lupine	native		x	
<i>Lupinus albifrons</i> var. <i>albifrons</i>	Silver bush lupine	native		x	x
<i>Lupinus bicolor</i>	Bicolored lupine	native			x
<i>Lupinus microcarpus</i> var. <i>densiflorus</i>	White-whorled lupine	native			x
<i>Lupinus microcarpus</i> var. <i>microcarpus</i>	Chick lupine	native		x	
<i>Lupinus nanus</i>	Sky lupine	native		x	x

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<i>Lupinus pachylobus</i>	Big-podded lupine	native			x
<i>Lupinus stiversii</i>	Harlequin lupine	native		x	
<i>Medicago polymorpha</i>	California bur-clover	non		x	x
<i>Melilotus albus</i>	White sweetclover	non		x	
<i>Melilotus officinalis</i>	Yellow sweetclover	non		x	x
<i>Pisum sativum</i>	Garden pea	non		x	x
<i>Sesbania punicea</i>	Scarlet wisteria	non			x
<i>Spartium junceum</i>	Scotch broom	non		x	
<i>Trifolium campestre</i>	Hop clover	non			x
<i>Trifolium depauperatum</i> var. <i>depauperatum</i>	Dwarf cowbag clover	native			x
<i>Trifolium dubium</i>	Little hop clover	non		x	x
<i>Trifolium glomeratum</i>	Sessile-headed clover	non			x
<i>Trifolium hirtum</i>	Rose clover	non		x	x
<i>Trifolium incarnatum</i>	Crimson clover	non			x
<i>Trifolium microcephalum</i>	Small-headed clover	native			x
<i>Trifolium repens</i>	White clover	non			x
<i>Trifolium subterraneum</i>	Subterranean clover	non			x
<i>Trifolium tomentosum</i>	Woolly-fruited clover	non			x
<i>Trifolium variegatum</i>	White-tipped clover	native			x
<i>Trifolium wildenovii</i>	Tomcat clover	native		x	x
<i>Vicia sativa</i> ssp. <i>sativa</i>	Spring vetch	non		x	x
<i>Vicia villosa</i>	Winter vetch	non			x
FAGACEAE					
<i>Lithocarpus densiflorus</i> var. <i>densiflorus</i>	Tan oak	native		x	
<i>Quercus berberidifolia</i>	Scrub oak	native		x	
<i>Quercus chrysolepis</i>	Canyon live oak	native		x	
<i>Quercus douglasii</i>	Blue oak	native		x	x
<i>Quercus kelloggii</i>	California black oak	native		x	
<i>Quercus lobata</i>	Valley oak	native		x	x
<i>Quercus wislizenii</i> var. <i>wislizenii</i>	Interior live oak	native		x	x
GENTIANACEAE					
<i>Centaurium muehlenbergii</i>	June centaury	native		x	x
<i>Centaurium venustum</i>	Canchalagua	native		x	
<i>Cicendia quadrangularis</i>	Timwort	native			x

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<i>Swertia albicaulis var. nitida</i>	Shining white-stemmed swertia	native		x	
GERANIACEAE					
<i>Erodium cicutarium</i>	Red-stemmed filaree	non		x	x
<i>Erodium botrys</i>	Long-beaked stork's-bill	non		x	x
<i>Erodium moschatum</i>	White-stemmed filaree	non		x	x
<i>Geranium dissectum</i>	Cut-leaved geranium	non		x	x
<i>Geranium pusillum</i>	Small geranium	non			x
GROSSULARIACEAE					
<i>Ribes nevadense</i>	Mountain pink currant	native		x	
HAMAMELIDACEAE					
<i>Hamamelis vernalis</i>	Witchazel	non		x	
HALORAGACEAE					
<i>Myriophyllum spicatum</i>	Eurasian milfoil	non			x
<i>Myriophyllum aquaticum</i>	Parrot's feather	non			x
HIPPOCASTANACEAE					
<i>Aesculus californica</i>	California buckeye	native		x	x
HYDROPHYLLACEAE					
<i>Draperia systyla</i>	Draperia	native		x	
<i>Eriodictyon californicum</i>	California yerba-santa	native		x	x
<i>Hydrophyllum occidentale</i>	California waterleaf	native		x	
<i>Nemophila pendunculata</i>	Meadow nemophila	native		x	
<i>Phacelia sp.</i>		native		x	
HYPERICACEAE					
<i>Hypericum anagalloides</i>	Tinker's penny	native		x	
<i>Hypericum concinnum</i>	Goldwire	native		x	
<i>Hypericum mutilum</i>	Small-flowered St. John's wort	non			x
<i>Hypericum perforatum</i>	Klamathweed	non		x	x
JUGLANDACEAE					

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Juglans californica var. hindsii	Northern California black walnut	native	1B	x	x
<i>Carya illinoensis</i>	Pecan	non			x
LAMIACEAE					
<i>Agastache urticifolia</i>	Horsemint	native		x	
<i>Lepechinia calycina</i>	California pitcher-sage	native		x	
<i>Lycopus americanus</i>	Cut-leaved bugleweed	native			x
<i>Marrubium vulgare</i>	Horehound	non		x	x
<i>Melissa officinalis</i>	Bee-balm	non			x
<i>Mentha pulegium</i>	Pennyroyal	non			x
<i>Mentha spicata</i>	Spearmint	non		x	x
<i>Monardella sheltonii</i>	Shelton's coyote-mint	native		x	x
<i>Monardella lanceolata</i>	Mustang-mint	native		x	
<i>Monardella villosa ssp. villosa</i>	Hairy coyote-mint	native		x	
<i>Pogogyne zizyphoroides</i>	Sacramento Valley pogogyne	native			x
<i>Prunella vulgaris var. lanceolata</i>	Mountain self-heal	native			x
<i>Pycnanthemum californicum</i>	Sierra-mint	native		x	
<i>Satureja douglasii</i>	Yerba buena	native		x	
<i>Scutellaria californica</i>	California skullcap	native		x	x
<i>Scutellaria tuberosa</i>	Danny's skullcap	native		x	
<i>Stachys pycnantha</i>	Short-spiked hedge nettle	non		x	x
<i>Stachys stricta</i>	Sonoma hedge-nettle	native		x	x
<i>Trichostemma lanceolatum</i>	Vinegar weed	native		x	x
LAURACEAE					
<i>Umbellularia californica</i>	California bay	native		x	
<i>Cinnamomum camphorum</i>	Camphor tree	non			x
LENTIBULARIACEAE					
<i>Utricularia gibba</i>	Humped bladderwort	non			x
LIMNANTHACEAE					
<i>Limnanthes alba ssp. alba</i>	White meadowfoam	native			x
<i>Limnanthes douglasii ssp. rosea</i>	Rosy meadowfoam	native			x

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LINACEAE					
<i>Hesperolinon californicum</i>	California western flax	native			x
<i>Linum bienne</i>	Pale flax	non		x	x
LOASACEAE					
<i>Mentzelia laevicaulis</i>	Giant blazingstar	native			x
LYTHRACEAE					
<i>Ammania coccinea</i>	Valley redstem	native			x
<i>Ammania robusta</i>	Robust redstem	native			x
<i>Lythrum hyssopifolium</i>	Hyssop loosestrife	non		x	x
<i>Lythrum salicaria</i>	Purple loosestrife	non			x
<i>Rotala ramosior</i>	Lowland toothcup	native			x
MALVACEAE					
<i>Malvella leprosa</i>	Alkali mallow	native		x	
<i>Modiola carolinianum</i>	Carolina bristle-mallow	non			x
<i>Sidalcea calycosa</i> ssp. <i>calycosa</i>	Annual checkerbloom	native			x
<i>Sidalcea diplocypha</i>	Fringed checkerbloom	native		x	x
<i>Sidalcea hartwegii</i>	Hartweg's checkerbloom	native		x	
<i>Sidalcea hirsuta</i>	Hairy checkerbloom	native			x
<i>Sidalcea malveflora</i> ssp. <i>asprella</i>	Harsh checkerbloom	native		x	x
MOLLUGINACEAE					
<i>Mollugo verticillata</i>	Indian chickweed	non		x	x
MORACEAE					
<i>Ficus carica</i>	Edible fig	non		x	x
<i>Morus alba</i>	White mulberry	non			x
MYRTACEAE					
<i>Eucalyptus globulus</i>	Blue-gum euclayptus	non			x
OLEACEAE					
<i>Fraxinus dipetala</i>	California ash	native			x
<i>Fraxinus latifolia</i>	Oregon ash	native		x	x
<i>Olea europaea</i>	Olive	non			x

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<i>Ligustrum sp.</i>	Privet	non			x
ONAGRACEAE					
Clarkia biloba ssp. brandegeae	Brandegee's clarkia	native	1B	x	x
Clarkia concinna ssp. concinna	Redribbons	native		x	
Clarkia gracilis ssp. albicaulis	White-stemmed clarkia	native	1B	x	
Clarkia purpurea ssp. quadrivulnera	Purple clarkia	native		x	x
Clarkia mosquinii	Mosquin's clarkia	native	1B	x	
Clarkia rhomboidea	Diamond clarkia	native		x	
Clarkia unguiculata	Elegant clarkia	native		x	x
Epilobium brachycarpum	Tall annual willowherb	native		x	x
Epilobium canum ssp. latifolium	California fuchsia	native		x	x
Epilobium cleistogamum	Cleistogamous spike-primrose	native			x
Epilobium densiflorum	Dense-flowered spike-primrose	native		x	x
Epilobium pygmaeum	Smooth spike-primrose	native			x
Epilobium sp.	Primrose	native		x	
<i>Ludwigia peploides ssp. montevidensis</i>	Montevideo waterweed	non			x
Ludwigia peploides ssp. peploides	Yellow waterweed	native			x
Oenothera elata ssp. hirsutissima	Hairy evening primrose	native			x
OROBANCHACEAE					
Orobanche unifloravar. uniflora	Naked broom-rape	native		x	x
Orobanche fasciculata	Clustered broom-rape	native		x	
OXALIDACEAE					
<i>Oxalis corniculata</i>	Creeping wood-sorrel	non		x	x
<i>Oxalis pes-caprae</i>	Bermuda buttercup	non			x
PAPAVERACEAE					
Eschscholzia caespitosa	Foothill poppy	native		x	
Eschscholzia californica var.	California poppy	native			x

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<i>californica</i>					
<i>Eschscholzia lobbii</i>	Fryingpans	native			x
PHILADELPHACEAE					
<i>Philadelphus lewisii</i>	Mock orange	native		x	x
PHYTOLACCACEAE					
<i>Phytolacca americana</i>	American pokeweed	non			x
PLANTAGINACEAE					
<i>Plantago coronopus</i>	Cut-leaved plantain	non			x
<i>Plantago elongata</i>	Elongate plantain	native			x
<i>Plantago erecta</i>	Erect plantain	native		x	x
<i>Plantago lanceolata</i>	English plantain	non		x	x
PLATANACEAE					
<i>Platanus racemosa</i>	California sycamore	native		x	x
POLYGALACEAE					
<i>Polygala cornuta</i> var. <i>cornuta</i>	Sierra milkwort	native			x
POLEMONIACEAE					
<i>Gilia capitata</i> ssp. <i>pedemontana</i>	Foothill globe gilia	native		x	
<i>Linanthus bicolor</i>	Bicolored linanthus	native		x	x
<i>Linanthus ciliatus</i>	Whiskerbrush	native		x	
<i>Linanthus filipes</i>	Wild baby's breath	native		x	
<i>Linanthus parviflorus</i>	Small-flowered linanthus	native		x	
<i>Linanthus</i> sp.		native		x	
<i>Navarretia filicaulis</i>	Thread-stemmed navarretia	native		x	
<i>Navarretia intertexta</i> ssp. <i>intertexta</i>	Needle-leaved navarretia	native			x
<i>Navarretia leucocephala</i> ssp. <i>leucocephala</i>	White-flowered navarretia	native			x
<i>Navarretia pubescens</i>	Downy navarretia	native		x	x
<i>Navarretia tagetina</i>	Marigold navarretia	native		x	x
<i>Navarretia viscidula</i>	Sticky navarretia	native			x
<i>Phlox speciosa</i> ssp. <i>occidentalis</i>	Western showy phlox	native		x	

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POLYGONACEAE					
<i>Chorizanthe polygonoides</i> var. <i>polygonoides</i>	Knotweed spineflower	native		x	
<i>Eriogonum nudum</i>		native		x	x
<i>Eriogonum roseum</i>	Wand buckwheat	native			x
<i>Eriogonum umbellatum</i>	Bright sulfur-flower	native		x	
<i>Eriogonum umbellatum</i> var. <i>nov.</i>	Ahart's sulphur-flower	native		x	
<i>Eriogonum vimineum</i>	Wicker buckwheat	native		x	
<i>Polygonum arenastrum</i>	Common knotweed	non		x	x
<i>Polygonum californicum</i>	California knotweed	native		x	x
<i>Polygonum hydropiper</i>	Water-pepper	non			x
<i>Polygonum lapathifolium</i>	Willow weed	native			x
<i>Polygonum punctatum</i>	Dotted smartweed	native			x
<i>Pterostegia drymariodes</i>	Pterostegia	native		x	
<i>Rumex acetosella</i>	Common sheep sorrel	non			x
<i>Rumex crispus</i>	Curly dock	non		x	x
<i>Rumex salicifolius</i> var. <i>salicifolius</i>	Willow dock	native			x
PORTULACACEAE					
<i>Calandrinia ciliata</i>	Redmaids	native			x
<i>Claytonia parviflora</i>	Small-flowered miner's lettuce	native		x	
<i>Claytonia perfoliata</i>	Miner's lettuce	native		x	x
PUNICACEAE					
<i>Punica granatum</i>	Pomegranate	non		x	
PRIMULACEAE					
<i>Anagallis arvensis</i>	Scarlet pimpernel	non		x	x
<i>Centunculus minimus</i>	Chaffweed	native			x
<i>Dodecatheon hendersonii</i>	Henderson's shootingstar	native		x	
<i>Trientalis latifolia</i>	Pacific starflower	native		x	
RANUNCULACEAE					
<i>Clematis lasiantha</i>	Chaparral clematis	native		x	x
<i>Delphinium hansenii</i> ssp. <i>hansenii</i>	Hansen's larkspur	native		x	x

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<i>Delphinium variegatum ssp. variegatum</i>	Royal larkspur	native		x	
<i>Kumlienia hystricula</i>	Waterfall buttercup	native		x	
<i>Myosorus minimus</i>	Common mousetail	native			x
<i>Ranunculus aquatilis var. aquatilis</i>	Broad-leaved water buttercup	native			x
<i>Ranunculus arvensis</i>	Field buttercup	non			x
<i>Ranunculus bonariensis var. trisepalus</i>	Three-sepaled buttercup	native			x
<i>Ranunculus muricatus</i>	Prickle-seeded buttercup	non			x
<i>Ranunculus occidentalis var. occidentalis</i>	Western buttercup	native			x
<i>Ranunculus sp.</i>	Buttercup	native		x	
RHAMNACEAE					
<i>Ceanothus cuneatus var. cuneatus</i>	Buck brush	native		x	x
<i>Ceanothus integerrimus</i>	Deerbrush	native		x	
<i>Rhamnus ilicifolia</i>	Holly-leaved redberry	native		x	x
<i>Rhamnus rubra</i>	Sierra coffeeberry	native		x	
<i>Rhamnus tomentella ssp. tomentella</i>	Hoary coffeeberry	native		x	x
<i>Ziziphus jujuba</i>	Common jujube	non		x	
ROSACEAE					
<i>Aphanes occidentalis</i>	Western lady's mantle	native			x
<i>Cercocarpus betuloides var. betuloides</i>	Birch leaved mountain mahogany	native		x	x
<i>Heteromeles arbutifolia</i>	Toyon	native		x	x
<i>Holodiscus discolor</i>	Oceanspray	native		x	
<i>Horkelia californica ssp. dissita</i>	Tall horkelia	native		x	
<i>Horkelia tridentata ssp. tridentata</i>	Three-toothed horkelia	native		x	
<i>Malus sylvestris</i>	apple	non		x	
<i>Potentilla glandulosa ssp. glandulosa</i>	Sticky cinquefoil	native		x	x
<i>Potentilla gracilis var. fastigiata</i>	Slender cinquefoil	native		x	
<i>Prunus cerisifera</i>	Cherry plum	non			x
<i>Prunus dulcis</i>	almond	non			x
<i>Prunus sp.</i>	cultivated plum	non		x	
<i>Pyracantha fortuneana</i>	Chinese firethorn	non			x

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<i>Rosa californica</i>	California wild rose	native		x	x
<i>Rubus discolor</i>	Himalyan blackberry	non		x	x
<i>Rubus glaucifolius</i>	Creeping raspberry	native		x	
<i>Rubus pensilvanicus</i>	Pennsylvania blackberry	non		x	x
<i>Rubus ursinus</i>	California blackberry	native		x	x
RUBIACEAE					
<i>Cephalanthus occidentalis</i> var. <i>californicus</i>	California button-willow	native		x	x
<i>Crucianella angustifolia</i>	Crosswort	non		x	x
<i>Galium aparine</i>	Cleavers	native			x
<i>Galium bolanderi</i>	Bolander's bedstraw	native		x	
<i>Galium divaricatum</i>	Lamarck's bedstraw	non			x
<i>Galium porrigens</i> var. <i>tenu</i>	Narrow-leaved climbing bedstraw	native		x	x
<i>Sherardia arvensis</i>	Field madder	non		x	x
SALICACEAE					
<i>Populus fremontii</i> ssp. <i>fremontii</i>	Fremont's cottonwood	native		x	x
<i>Salix exigua</i>	Sandbar willow	native		x	x
<i>Salix gooddingii</i>	Goodding's black willow	native		x	x
<i>Salix laevigata</i>	Red willow	native		x	x
<i>Salix lasiolepis</i>	Arroyo willow	native		x	x
<i>Salix melanopsis</i>	Dusky willow	native		x	
SAXIFRAGACEAE					
<i>Heuchera micrantha</i> var. <i>erubescens</i>	Crevice alumroot	native		x	
<i>Lithophragma</i> sp.	Woodlandstar	native		x	
<i>Saxifraga</i> sp.	Saxifrage	native		x	
<i>Tellima grandiflora</i>	Fringecups	native		x	
SCROPHULARIACEAE					
<i>Antirrhinum vexillo-calyculatum</i> ssp. <i>intermedium</i>	Wiry snapdragon	native		x	
<i>Castilleja attenuata</i>	Valley-tassels	native		x	x
<i>Castilleja affinis</i> var. <i>affinis</i>	Indian-paintbrush	native			x
<i>Castilleja campestris</i>	Field owl-clover	native			x
<i>Castilleja lacera</i>	Cut-leaved owl-clover	native		x	x

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<i>Collinsia heterophylla</i>	Chinese houses	native		x	
<i>Collinsia tinctoria</i>	Sticky chinese houses	native		x	x
<i>Cordylanthus pilosus</i> ssp. <i>trifidus</i>	Trifid bird's beak	native		x	
<i>Gratiola ebracteata</i>	Bractless hedge-hyssop	native			x
<i>Keckiella breviflora</i> ssp. <i>glabrisepala</i>	Gaping keckiella	native		x	x
<i>Limosella acaulis</i>	Narrow-leaved mudwort	native			x
<i>Lindernia dubia</i> var. <i>anagallidea</i>	False pimpernel	native			x
<i>Mimulus aurantiacus</i> ssp. <i>aurantiacus</i>	Bush monkey-flower	native		x	x
<i>Mimulus cardinalis</i>	Scarlet monkey-flower	native		x	x
<i>Mimulus glaucescens</i>	Shield-bracted monkey-flower	native	4	x	
<i>Mimulus guttatus</i>	Seep monkey-flower	native		x	x
<i>Mimulus inconspicuus</i>	Small-flowered monkey-flower	native	4	x	
<i>Mimulus moschatus</i>	Musk monkey-flower	native			x
<i>Mimulus torreyi</i>	Torrey's monkeyflower	native		x	
<i>Mimulus tricolor</i>	Tri-colored monkey-flower	native			x
<i>Parentucellia viscosa</i>	Yellow parentuchellia	non		x	x
<i>Pedicularis densiflora</i>	Indian-warrior	native		x	
<i>Penstemon laetus</i> var. <i>leptosepalus</i>	Western graybeard	native		x	
<i>Triphysaria eriantha</i> ssp. <i>eriantha</i>	Johnnytuck	native			x
<i>Tryphysaria pusilla</i>	Dwarf owl-clover	native		x	
<i>Verbascum blattaria</i>	Moth mullein	non		x	x
<i>Verbascum thapsus</i>	Woolly mullein	non		x	x
<i>Veronica americana</i>	American brooklime	native			x
<i>Veronica anagallis-aquatica</i>	Great water speedwell	non		x	x
<i>Veronica peregrina</i> ssp. <i>halapensis</i>	Purslane speedwell	native			x
SIMARUBACEAE					
<i>Ailanthus altissima</i>	Tree-of-heaven	non		x	x
SOLANACEAE					
<i>Datura ferox</i>	Chinese thorn-apple	non		x	
<i>Datura stramonium</i> var. <i>stramonium</i>	White-stemmed jimsonweed	non		x	

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<i>Nicotiana acuminata</i> var. <i>multiflora</i>	Many-flowered tobacco	non		x	
<i>Nicotiana glauca</i>	Tree tobacco	non			x
<i>Physalis acutifolia</i>	Sharp-leaved ground-cherry	native			x
<i>Physalis lanceifolia</i>	Lance-leaved ground-cherry	non			x
<i>Solanum parishii</i>	Parish's nightshade	native		x	
STYRACACEAE					
<i>Styrax officinalis</i> var. <i>rediviva</i>	California snowbell	native			x
URTICACEAE					
<i>Urtica dioica</i> ssp. <i>holosericea</i>	Hoary creek nettle	native		x	x
VALERIANACEAE					
<i>Plectritis</i> sp.	Plectritis	native		x	
<i>Centranthus ruber</i>	Red valerian	non			x
VERBENACEAE					
<i>Phyla nodiflora</i> var. <i>rosea</i>	Rosy lippia	non			x
<i>Verbena hastata</i>	Halberd-leaved vervain	native		x	x
<i>Verbena litoralis</i>	Shore vervain	non			x
VIOLACEAE					
<i>Viola odorata</i>	English violet	non			x
VISCACEAE					
<i>Arceuthobium occidentale</i>	Gray pine dwarf mistletoe	native		x	x
<i>Phoradendron villosum</i>	Hairy mistletoe	native		x	
VITACEAE					
<i>Vitis californica</i>	California wild grape	native		x	x

MONOCOTS

ALISMACEAE					
<i>Alisma plantago-aquatica</i>	Water-plantain	native		x	x
<i>Echinodorus berteroi</i>	Burhead	native			x
<i>Sagittaria montevidensis</i> ssp. <i>calycina</i>	Montevideo arrowhead	native			x

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Sagittaria sanfordii	Sanford's arrowhead	native	1B		x
CYPERACEAE					
Carex barbarae	Santa Barbara sedge	native			x
Carex bolanderi	Bolander's sedge	native		x	
Carex densa	Dense sedge	native			x
Carex feta	Green-sheathed sedge	native		x	
Carex fracta	Fragile-sheathed sedge	native		x	
Carex hirtissima	Fuzzy sedge	native		x	
Carex multicaulis	Many-stemmed sedge	native		x	
Carex nudata	Torrent sedge	native		x	
Carex praegracilis	Clustered field sedge	native		x	
Carex vulpinoidea	Fox sedge	native	2		x
Carex sp.	(in Acutae group)	native		x	
<i>Cyperus difformis</i>	Small-flowered cyperus	non			x
Cyperus eragrostis	Tall cyperus	native		x	x
Cyperus erythrorhizos	Red-rooted cyperus	native			x
<i>Cyperus iria</i>	Iria sedge	non			x
Cyperus niger	Black cyperus	native		x	x
Cyperus squarrosus	Awed cyperus	native			x
Cyperus strigosus	False nutsedge	native		x	x
Eleocharis acicularis var. acicularis	Needle spike-rush	native		x	x
Eleocharis atropurpurea	Purple spike-rush	native			x
Eleocharis macrostachya	Pale spike-rush	native		x	x
Eleocharis obtusa var. engelmannii	Engelmann's spike-rush	native			x
<i>Eleocharis pachycarpa</i>	Thick-fruited spike-rush	non		x	x
Eleocharis quadrangulata	Four-angled spikerush	native	2		x
Eleocharis radicans	Rooting spikerush	native			x
Scirpus acutus var. occidentalis	Hard-stemmed tule	native		x	x
<i>Scirpus mucronatus</i>	Rough-seeded bulrush	non			x
<i>Scirpus setaceus</i>	Bristle-leaved bulrush	non		x	
HYDROCHARITACEAE					
Elodea canadensis	Canadian waterweed	native			x

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IRIDACEAE					
<i>Iris hartwegii</i> ssp. <i>hartwegii</i>	Hartweg's iris	native		x	
<i>Iris macrosiphon</i>	Long-tubed iris	native		x	x
<i>Iris psuedacorus</i>	Yellow water-iris	non			x
<i>Sisyrinchium bellum</i>	Blue-eyed grass	native		x	
JUNCACEAE					
<i>Juncus acuminatus</i>	Sharp-fruited rush	native			x
<i>Juncus articulatus</i>	Jointed rush	native		x	
<i>Juncus balticus</i> var. <i>balticus</i>	Baltic rush	native		x	x
<i>Juncus bufonius</i> var. <i>bufonius</i>	Common toadrush	native		x	x
<i>Juncus capitatus</i>	Leafy-bracted dwarf rush	non		x	x
<i>Juncus diffusissimus</i>	Diffuse rush	non			x
<i>Juncus effusus</i> var. <i>exiguus</i>	Short rush	native		x	
<i>Juncus mexicanus</i>	Mexican rush	native		x	x
<i>Juncus oxymeris</i>	Pointed rush	native		x	
<i>Juncus tenuis</i>	Slender rush	native		x	x
<i>Juncus uncialis</i>	Inch-high rush	native			x
<i>Juncus xiphioides</i>	Iris-leaved rush	native			x
<i>Luzula comosavar.</i> <i>subsessilis</i>	Sessile wood-rush	native		x	
LEMNACEAE					
<i>Lemna</i> sp.	Duckweed	native			x
<i>Wolffia borealis</i>	Northern water-meal	native			x
<i>Wolffia brasiliensis</i>	Brazilian water-meal	native	2		x
LILIACEAE					
<i>Allium amplexans</i>	Clasping onion	native			x
<i>Allium peninsulare</i> var. <i>peninsulare</i>	Mexican onion	native		x	x
<i>Brodiaea californica</i>	California brodiaea	native			x
<i>Brodiaea coronaria</i> var. <i>coronaria</i>	Harvest brodiaea	native			x
<i>Brodiaea elegans</i> ssp. <i>elegans</i>	Elegant brodiaea	native		x	x
<i>Brodiaea minor</i>	Bluestars	native			x
<i>Calochortus albus</i>	Fairy lantern	native		x	x
<i>Calochortus luteus</i>	Yellow mariposa-lily	native			x
<i>Calochortus monophyllus</i>	Yellow star tulip	native		x	

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<i>Calochortus superbus</i>	Superb mariposa-lily	native		x	
<i>Calochortus tolmiei</i>	Pussy-ears	native		x	
<i>Chlorogalum angustifolium</i>	Narrow-leaved soap plant	native			x
<i>Chlorogalum pomeridianum</i> var. <i>pomeridianum</i>	Wavy-leaved soap plant	native		x	x
<i>Dichelostemma capitatum</i> ssp. <i>capitatum</i>	Bluedicks	native		x	x
<i>Dichelostemma multiflorum</i>	Round-toothed ookow	native			x
<i>Dichelostemma volubile</i>	Twining ookow	native		x	x
<i>Erythronium multiscapoideum</i>	Sierra fawn-lily	native		x	
<i>Fritillaria</i> sp.	fritillary	native		x	
<i>Fritillaria eastwoodiae</i>	Butte County fritillary	native	1B	x	
<i>Lilium humboldtii</i> ssp. <i>humboldtii</i>	Humboldt lily	native	4	x	x
<i>Odontostomum hartwegii</i>	Hartweg's odontostomum	native			x
<i>Triteleia bridgesii</i>	Bridge's triteleia	native		x	
<i>Triteleia hyacinthina</i>	Wild hyacinth	native		x	x
<i>Triteleia ixiodes</i> ssp. <i>anilina</i>	Mountain prettyface	native		x	
<i>Triteleia ixiodes</i> ssp. <i>scabra</i>	Foothill prettyface	native		x	
<i>Triteleia laxa</i>	Ithuriel's spear	native		x	x
<i>Zigadenus fremontii</i>	Fremont's zigadene	native			x
ORCHIDACEAE					
<i>Goodyera oblongifolia</i>	Rattlesnake-plantain	native		x	
<i>Piperia elongata</i>	Dense-flowered rein orchid	native		x	x
<i>Piperia transversa</i>	Cross-spurred piperia	native		x	
<i>Piperia unalascensis</i>	Alaska piperia	native		x	
POACEAE					
<i>Aegilops cylindrica</i>	Jointed goatgrass	non		x	x
<i>Agrostis exarata</i>	Spiked bentgrass	native			x
<i>Agrostis viridis</i>	Water bentgrass	non		x	
<i>Aira caryophyllea</i>	Silver European hairgrass	non		x	x
<i>Alopecurus saccatus</i>	Vernal pool foxtail	native			x
<i>Andropogon virginicus</i> var. <i>virginicus</i>	Broomsedge bluestem	non		x	x
<i>Aristida oligantha</i>	Oldfield three-awn	native		x	x
<i>Arundo donax</i>	Giant-reed	non			x

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FAMILY Genus species	Common Name	Origin	CNPS List	At lake	Below dam
<i>Avena barbata</i>	Slender wild oat	non		x	x
<i>Avena fatua</i>	Wild oat	non		x	x
<i>Brachypodium distachyon</i>	False brome	non		x	x
<i>Briza maxima</i>	Greater quaking grass	non		x	x
<i>Briza minor</i>	Lesser quaking grass	non		x	x
<i>Bromus arenarius</i>	Australian brome	non			x
<i>Bromus carinatus</i> var. <i>carinatus</i>	California brome	native		x	
<i>Bromus catharticus</i>	Rescuegrass	non			x
<i>Bromus diandrus</i>	Ripgut grass	non		x	x
<i>Bromus hordeaceus</i>	Softchess	non		x	x
<i>Bromus laevipes</i>	Woodland brome	native		x	x
<i>Bromus madritensis</i> ssp. <i>rubens</i>	Foxtail chess	non		x	x
<i>Cortaderia selloana</i>	Pampasgrass	non			x
<i>Crypsis vaginiflora</i>	African prickleggrass	non			x
<i>Cynodon dactylon</i>	Bermuda grass	non		x	x
<i>Cynosurus echinatus</i>	Hedgehog dogtail	non		x	x
<i>Dactylis glomerata</i>	Orchardgrass	non		x	
<i>Deschampsia danthonioides</i>	Annual hairgrass	native			x
<i>Digitaria ischaemum</i>	Smooth crabgrass	non			x
<i>Digitaria sanguinalis</i>	Hairy crabgrass	non		x	x
<i>Distichlis spicata</i>	Saltgrass	native			x
<i>Echinochloa crus-galli</i>	Barnyard grass	non			x
<i>Elymus elymoides</i>	Squirreltail	native		x	x
<i>Elymus glaucus</i> ssp. <i>glaucus</i>	Blue wildrye	native		x	x
<i>Elymus glaucus</i> ssp. <i>jepsonii</i>	Jepson's wild rye	native		x	
<i>Elytrigia</i> sp.	Wheatgrass	non			x
<i>Eragrostis pectinacea</i> var. <i>pectinacea</i>	Purple lovegrass	native			x
<i>Festuca californica</i>	California fescue	native		x	
<i>Gastridium ventricosum</i>	Nitgrass	non		x	x
<i>Hainardia cylindrica</i>	Barbgrass	native			x
<i>Holcus lanatus</i>	Common velvetgrass	non		x	x
<i>Hordeum brachyantherum</i>	Meadow barley	native			x
<i>Hordeum jubatum</i>	Foxtail barley	native			x
<i>Hordeum marinum</i> ssp. <i>gussoneanum</i>	Mediterranean barley	non		x	x
<i>Hordeum murinum</i> ssp. <i>leporinum</i>	Hare wall barley	non		x	x

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FAMILY Genus species	Common Name	Origin	CNPS List	At lake	Below dam
<i>Leersia oryzoides</i>	Rice cutgrass	non		x	x
<i>Leymus triticoides</i>	Alkali ryegrass	native		x	x
<i>Lolium multiflorum</i>	Italian ryegrass	non		x	x
<i>Melica californica</i>	California melic	native		x	x
<i>Melica geyeri</i>	Geyer's melic	native		x	
<i>Melica torreyana</i>	Torrey's melic	native			x
<i>Muhlenbergia rigens</i>	Deer grass	native		x	x
<i>Nassella pulchra</i>	Purple needlegrass	native		x	x
<i>Panicum acuminatum var. lindheimeri</i>	Redtop panicgrass	native			x
<i>Panicum capillare</i>	Witchgrass	native		x	x
<i>Panicum dichotomiflorum</i>	Smooth witchgrass	non			x
<i>Paspalum dilatatum</i>	Dallisgrass	non		x	x
<i>Phalaris aquatica</i>	Harding-grass	non		x	x
<i>Phalaris caroliniana</i>	Carolina canarygrass	non			x
<i>Phalaris minor</i>	Lesser canarygrass	non			x
<i>Poa annua</i>	Annual bluegrass	non		x	x
<i>Poa bulbosa</i>	Bulbous bluegrass	non		x	
<i>Poa tenerima</i>	Delicate bluegrass	native			x
<i>Polypogon australis</i>	Southern beardgrass	non			x
<i>Polypogon maritimus</i>	Mediterranean beardgrass	non			x
<i>Polypogon monspeliensis</i>	Annual beardgrass	non		x	x
<i>Seteria viridis</i>	Green bristlegrass	non		x	x
<i>Sorghum halapense</i>	Johnsongrass	non		x	x
<i>Taeniatherum caput-medusae</i>	Medusa-head	non		x	x
<i>Vulpia microstachys var. ciliata</i>	Fringed fescue	native			x
<i>Vulpia myuros var. myuros</i>	Rattail fescue	non		x	x
POTAMOGETONACEAE					
<i>Potamogeton sp.</i>	Pondweed	native			x
TYPHACEAE					
<i>Typha dominguensis</i>	Southern cattail	native		x	x
<i>Typha latifolia</i>	Broad-leaved cattail	native		x	x
ZANNICHELLIACEAE					
<i>Zannichellia palustris</i>	Horned pondweed	native			x

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